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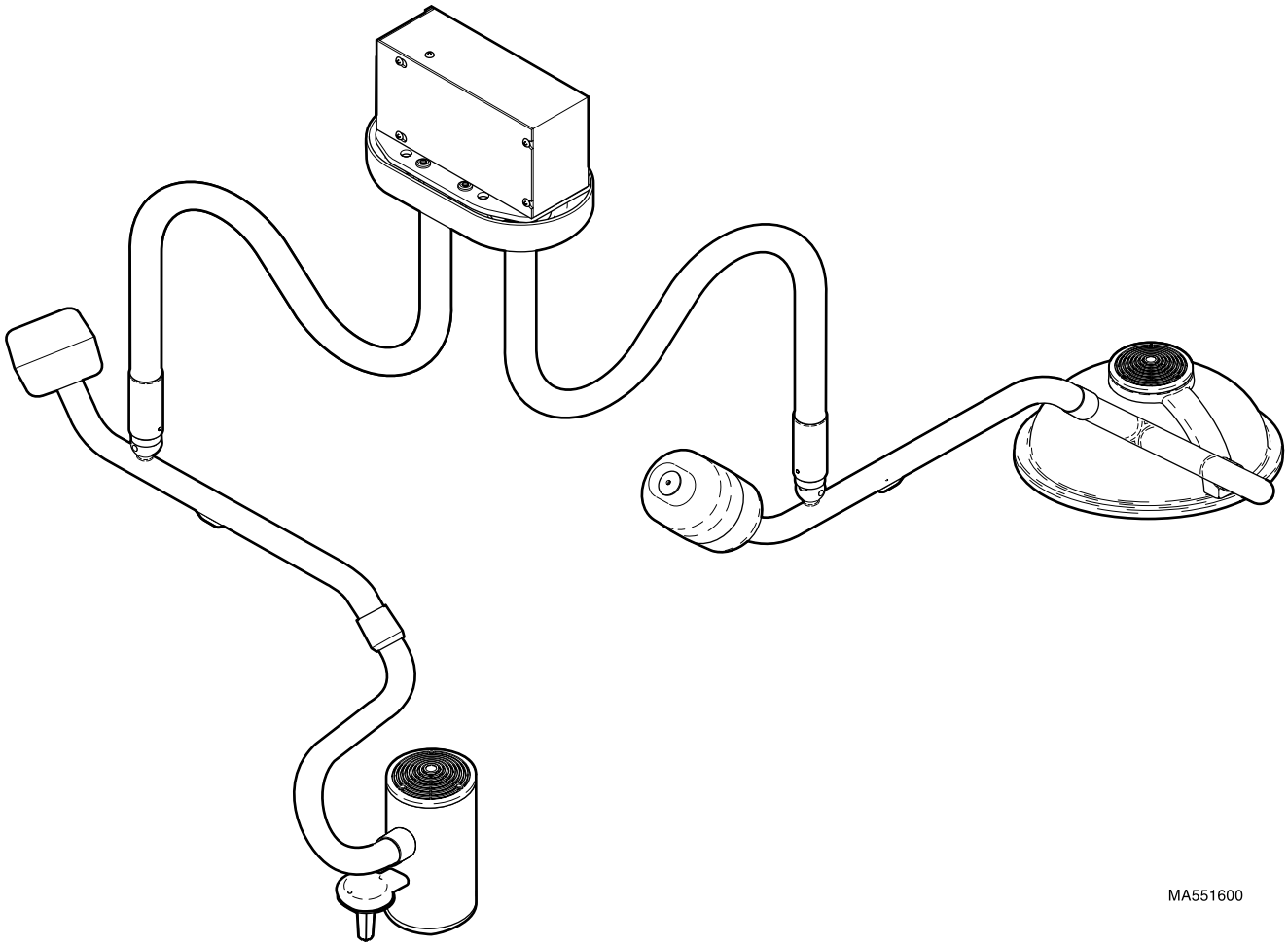
Installation Manual

354 / 355 Combination Lighting System



MA551600

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Important! - Please Read First

This document is broken down into three parts: This page, which provides additional information for installing a 354 / 355 combination light, a 354 Installation Manual, and a 355 Installation Manual.

Additional information required to install a 354 / 355 combination light:

EQUIPMENT ALERT
Failure to connect the correct model to the correct transformer may result in a blown fuse and / or bulb.

The 354 light system's down arm and 355 light system's down arm must be connected to the ceiling plate in the position shown (see Figure A). This is necessary because the transformer output voltage is different for each light system and is not interchangeable. To identify the correct mounting location for each light, inspect the transformers. The model 354 transformer is labeled with part number 015-1206-00 and its secondary leads are marked as S-1 (blue wire) and S-2 (brown wire). The model 355 transformer is labeled with part number 015-1356-00 and its secondary leads are unmarked.

Use the following two pages of additional information plus the instructions contained in the 354 Installation manual to install and adjust the 354 Lighting System. Use the following two pages of additional information plus the instructions contained in the 355 Installation manual to install and adjust the 355 Lighting System.

354 Installaton Manual

355 Installation Manual

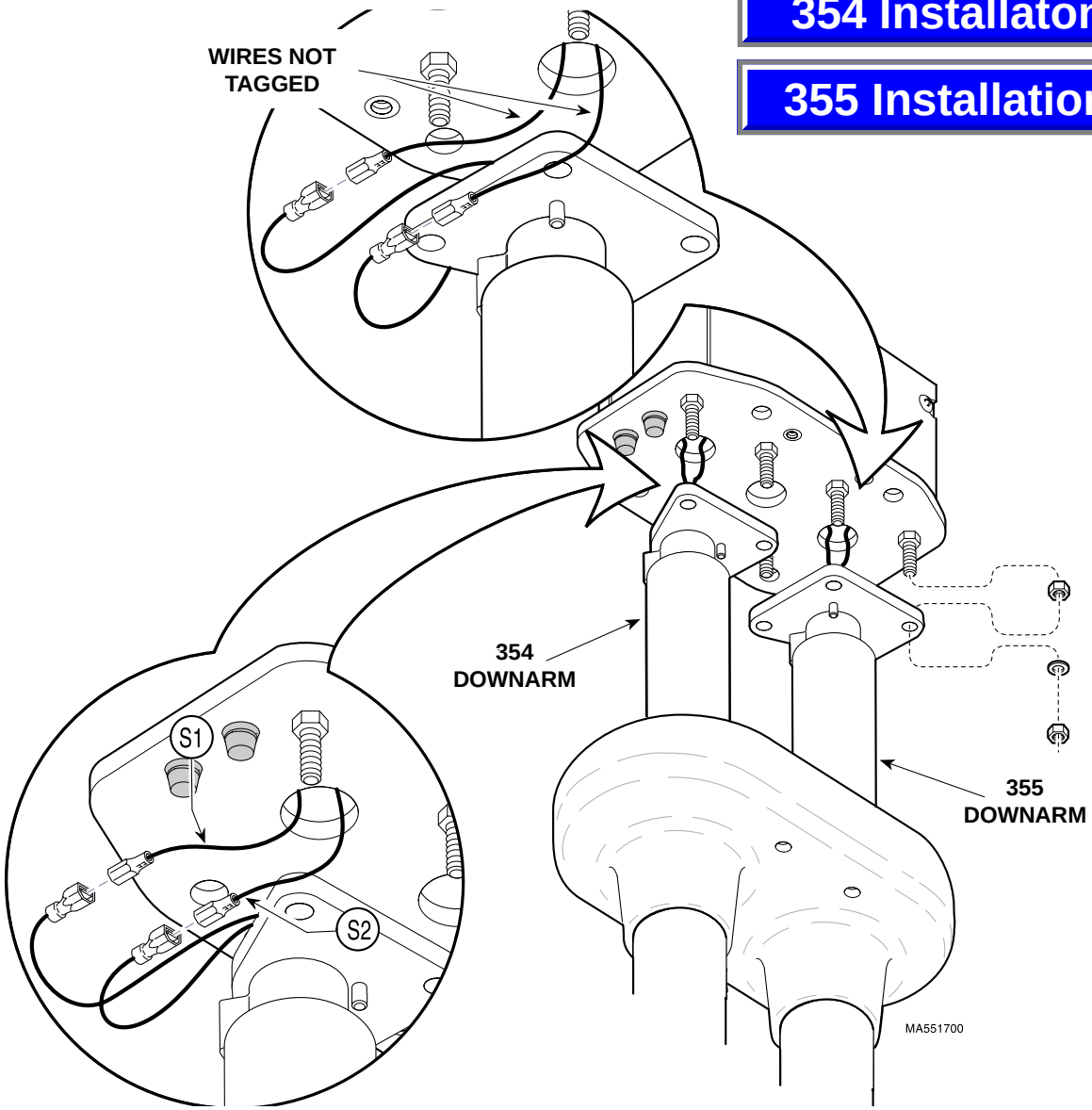

Figure A. Mounting Locations for the 354 and 355 Downarms on a 354 / 355 Combination Lighting System

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(*) NOTE:

Select transformer input tap by measuring the input voltage. Then, connect the power lead (white wire) to one of the following according to the input voltage measured:
117.0 VAC or lower - Use the terminal marked N1/114V or N2/114V.
117.1 VAC to 123.0 VAC - Use the terminal marked N1/120V or N2/120V.
123.1 VAC or higher - Use the terminal marked N1/126V or N2/126V.

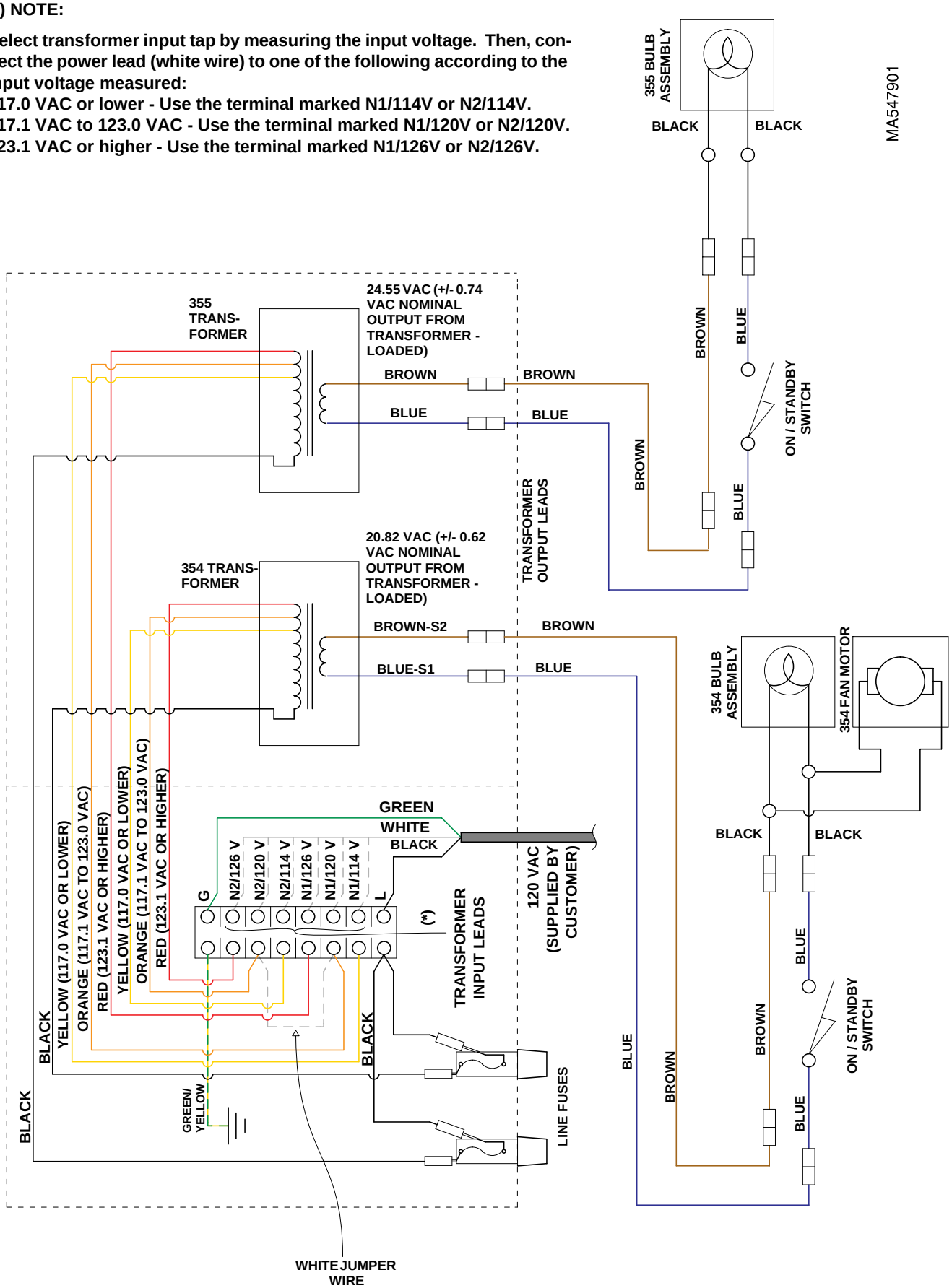

Figure B. Wiring Diagram For 354 / 355 Combination Lighting System

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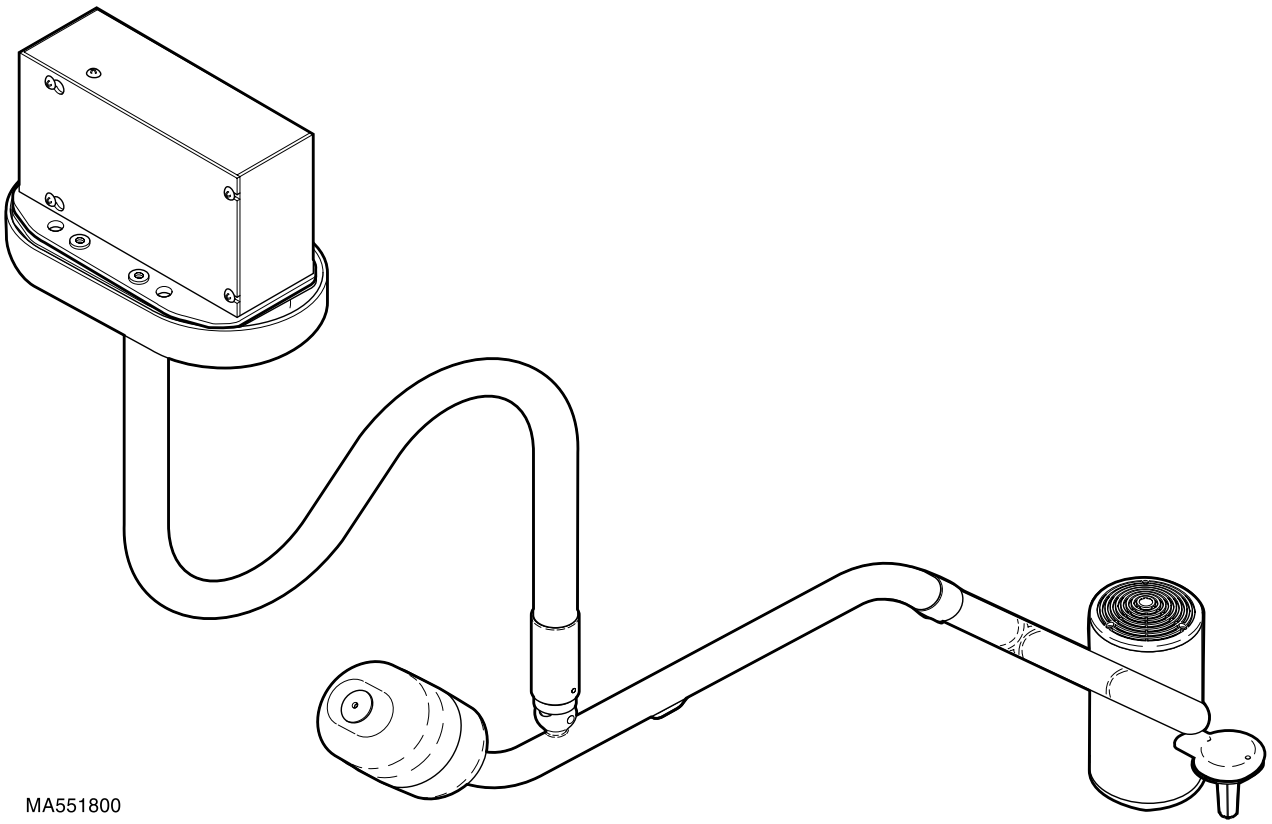
Installation Manual

354 Lighting System



MA551800

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Owner's Product Identification

(information that you will need to provide for servicing - key information is highlighted)

Date of Purchase	***Serial Number***
Name of Owner / Facility / Department	***Model Number***
Name of Authorized Dealer	Telephone # of Authorized Dealer
Address of Authorized Dealer	

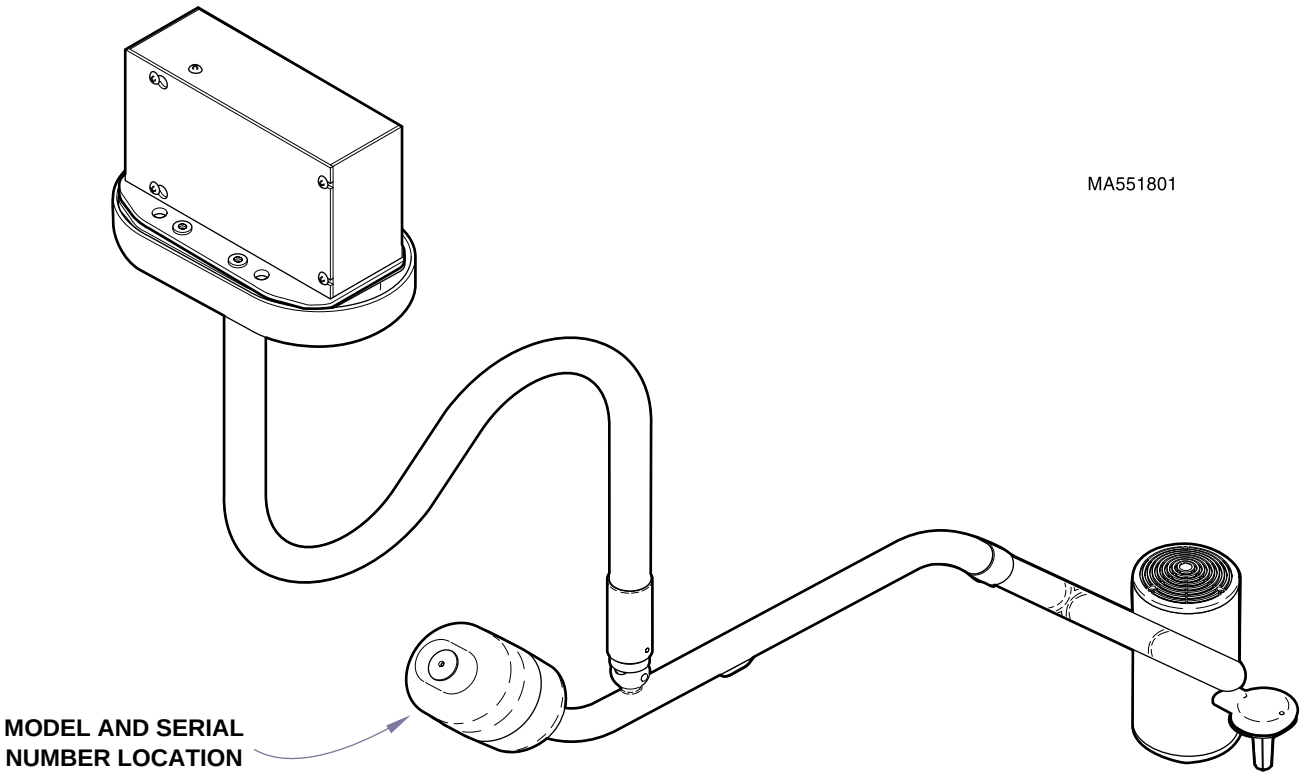

Figure 1. Model Number / Serial Number Location

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IMPORTANT INFORMATION

SCOPE AND PURPOSE OF THIS MANUAL

This manual covers complete instructions for the installation of the 354 Lighting System and is intended to be used by personnel involved in the installation of the 354 Lighting System. The Operation Manual (Part Number: 003-1071-xx) for the 354 Lighting System is a separate document and is intended for persons who will operate the 354 Lighting System.

INTENDED USE OF PRODUCT

This product is intended for use in all medical environments where illumination is required for external examinations and procedures.

SAFETY INSTRUCTIONS

The primary concern of Midmark is that this equipment be operated and maintained with the safety of the users in mind. To assure safer and more reliable operation, do the following: (1) Read this manual before installing your light assembly; (2) Assure that appropriate personnel are informed on the contents of this manual--this is the responsibility of the purchaser; (3) Be sure that you understand the instructions contained in this manual before attempting to install this light assembly; (4) Be sure that you have read and understand the instructions contained in the Operation Manual (a separate document) before attempting to operate this equipment.

EXPLANATION OF SAFETY SYMBOLS AND NOTES

Throughout this manual are safety alert symbols that call attention to particular procedures. These items are used as follows:

DANGER
A DANGER is used for an imminently hazardous operating procedure, practice, or condition which, if not correctly followed, will result in loss of life or serious personal injury.

WARNING
A WARNING is used for a potentially hazardous operating procedure, practice, or condition which, if not correctly followed, could result in loss of life or serious personal injury.

CAUTION
A CAUTION is used for a potentially hazardous operating procedure, practice, or condition which, if not correctly followed, could result in minor or moderate injury. It may also be used to alert against unsafe practices.

EQUIPMENT ALERT
An EQUIPMENT ALERT is used for an imminently or potentially hazardous operating procedure, practice, or condition which, if not correctly followed, will or could result in serious, moderate, or minor damage to unit.

NOTE
A NOTE is used to amplify an operating procedure, practice or condition.

Indicates that the unit is rated: Type B, Applied Part.

Indicates that the operator's manual should be consulted for important information.

Indicates the presence of a dangerous voltage / shock hazard.

Indicates a fuse rating specification

Indicates a protective earth ground.

Indicates that the product is fragile; do not handle roughly.

Indicates the proper shipping orientation for the product.

Indicates that the product must be kept dry.

Indicates a hot surface.

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TRANSPORTATION AND STORAGE CONDITIONS

- Ambient Temperature Range: ... -22°F to 140°F (-30°C to +60°C)
- Relative Humidity ..... 10% to 90% (non-condensing)
- Atmospheric Pressure ..... 500hPa to 1060hPa (0.5 bar to 1.06 bars)

This product contains glass, so it should be transported and stored with care to limit vibrations and shocks.

GENERAL INFORMATION

LIGHTING SYSTEM

The 354 lighthead assembly is a compact spotlight. The spotlight design provides excellent control over the diameter of the lighted area. Through the movement of two levers, the user has complete control over the light beam diameter between 3 in. (7.6 cm) to 10 in. (25.4 cm) and over the brightness of the lighted area. The peak illumination is 4,000 fc (43,000 lux) at a distance of 36 in. (91.4 cm). The plastic handle can be easily removed for sterilization or it accepts a Devon EZ Handle™ without requiring an awkward adapter. The arm assembly has been precisely designed, assembled, and balanced so that the lighthead can be positioned with minimal force and no drifting will occur. In addition, multiple pivot points make the positioning of the lighthead easy and flexible.

SPECIFICATIONS

See Table 1 for specifications on the 354 Lighting System.

Model 354 Light

Beam diameter @ 36 in. (91.4 cm.): ..... Variable from 3 to 10 in. (7.6 to 25.4 cm)

Bulb: ..... 21.0 VAC, 150 W halogen bulb

Color temperature: 4,200K

Focal length: ..... 36 in. (91.4 cm)

Illumination @ 36 in. (91.4 cm): ..... 4,000 fc (43,000 lux)

Electrical requirement: ..... 120 VAC, 60 HZ 1.5 amps, single phase

Reach of arm assemblies: ... 49.5 in. (126 cm) maximum from centerline of down tube to center of lighthead.

Rotation of Lighthead: ..... 180° rotation at lamp tube connection

Rotation of lamp tube: ..... 540° rotation at cross tube connection

Rotation of cross tube: ..... 580° rotation at down tube connection

Vertical range of cross tube: ..... -35° to +35° vertical movement

Rotation of down tube: ..... 580° rotation at ceiling plate connection

Weight of 8 ft. (2.44 m) single light assembly: ..... 59 lbs (26.8 kg)

Weight of 9 ft. (2.74 m) single light assembly: ..... 60 lbs (27.2 kg)

Weight of 8 ft. (2.44 m) dual light assembly: ..... 105 lbs (47.6 kg)

Weight of 9 ft. (2.74 m) dual light assembly: ..... 107 (48.5 kg)

Certifications: ..... Classified by Underwriters Laboratories Inc. with respect to electric shock, fire, and mechanical hazards only in accordance with UL2601-1 and CAN/CSA C22.2, No.601.1.
ISO-9001 Certified

Classifications: ..... Class 1, Type B applied part, Ordinary Equipment, Continuous Operation

Fuse Rating: ..... 1.6 amp, 250 VAC, 5mm x 20mm, Type T, low breaking capacity, IEC 127-2/3

Equipment not suitable for use in the presence of a flammable anesthetic mixture with air, oxygen, or nitrous oxide.

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354 LIGHTING SYSTEM INSTALLATION

UNPACKING

NOTE
Below is a list of all the items which should be included in the shipping box(es). The first quantity indicates the number of items which should be present for a single lighting assembly while the second quantity indicates the number of items which should be present for a dual lighting assembly (Refer to Figure 2).

(1) Cut banding and remove box lid from box.

(2) Remove one / two cross tube/lighthead assembly (1, Figure 2) and inspect.

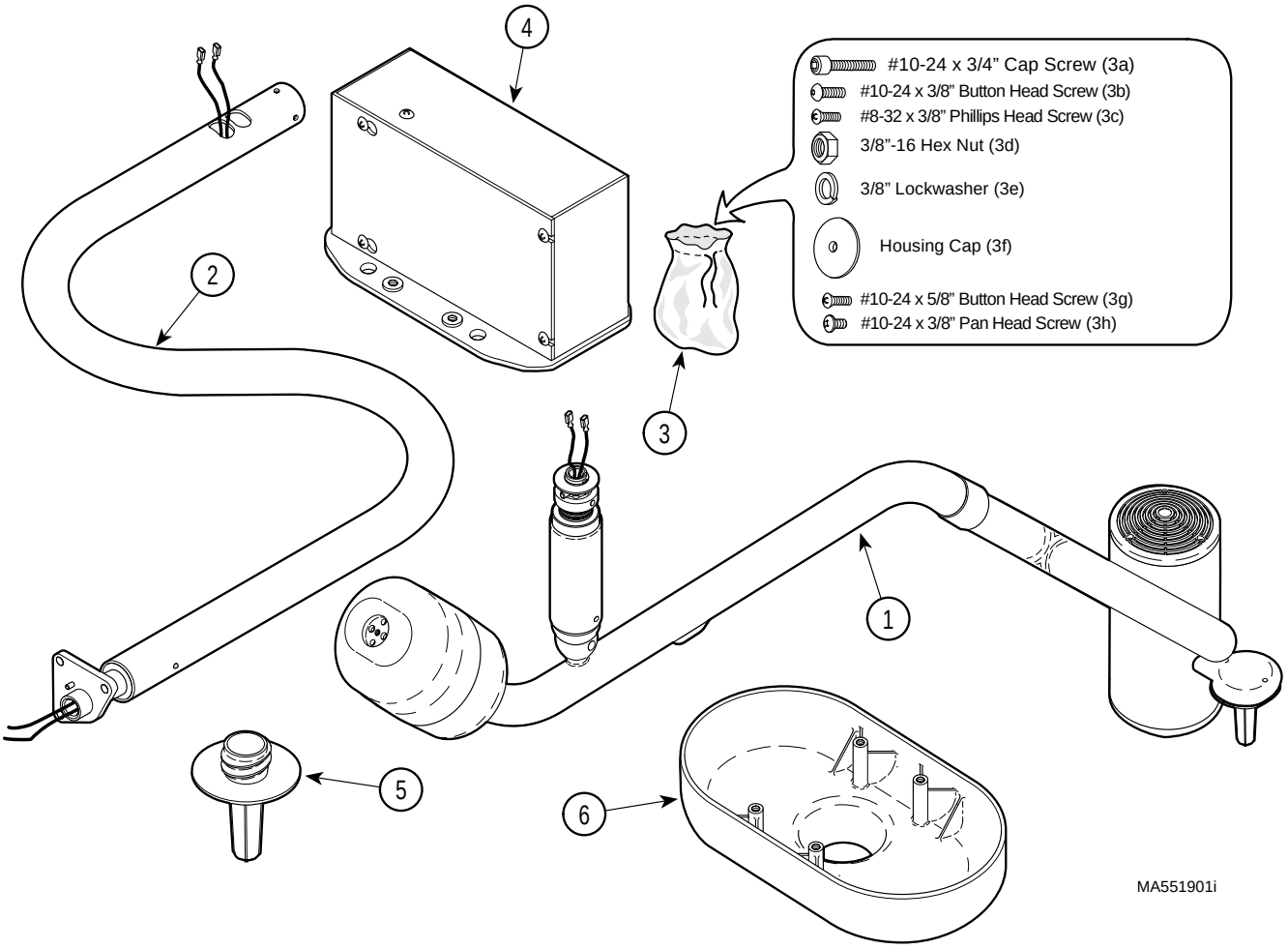

Figure 2. Components Unpacking and Inventory

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(3) Remove one/two down tube assembly (2) and inspect.

(4) Remove one/two cotton bag(s) (3) and inventory contents; the following items should be included:

3a. Four #10-24 x 3/4" socket cap screws
3b. Two/four #10-24 x 3/8" black oxide button head screws
3c. One/two #8-32 x 3/8" phillips head screw **(Used on Model Serial # KN, KP, KS, KT, LY, LZ, MA, MB, *and on* MX1000 *thru* MX1112, MZ1000 *thru* MZ1167)**
3d. Six/twelve 3/8"-16 hex nuts
3e. Three/six 3/8" lockwashers
3f. One/two housing cap
3g. One/two #10-24 x 5/8" zinc plated button head screws
3h. One/two #10-24 x 3/8" pan head screws **(Used on Model Serial # MX1113 & MZ1168 *thru* Present)**

[Fastener Installation Kit (002-0695-00) includes all components listed above.]

(5) Remove one ceiling plate assembly (4) and inspect.

(6) Remove one/two sterilizable handle(s) and inspect.

(7) Remove one ceiling cover (6) and inspect.

RECOMMENDED CEILING MOUNTING LOCATIONS (FOR DENTAL AND ORAL SURGERY APPLICATIONS)

See Figure 3 for recommended ceiling mounting locations. These locations allow the lighthead to be positioned over any portion of the patients body without running into a physical arm restriction; mounting the light system on the centerline of the chair or headrest will result in some areas of the patient's body not being able to be illuminated by the lighthead. Also, the light system should be mounted on the opposite side of the table as the dentist's or oral surgeon's work position, so the light system is not hanging above their head.

CEILING SUPPORT STRUCTURE INSTALLATION

Weights:

- 8 ft. (2.44 m) Single 354 Lighting System (less customer supplied ceiling structure):.....59 lbs (26.8 kgs)

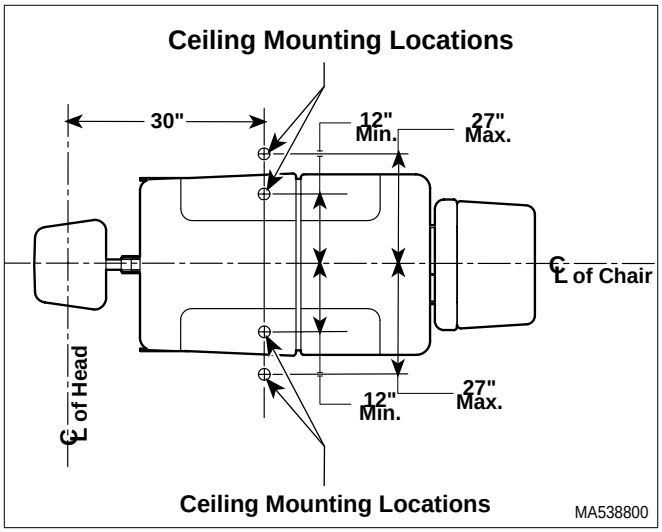

Figure 3. Recommended Ceiling Mounting Locations (For Dental and Oral Surgery Applications

- 9 ft. (2.74 m) Single 354 Lighting System (less customer supplied ceiling structure):.....60 lbs (27.2 kgs)
- 8 ft. (2.44 m) Dual 354 Lighting System (less customer supplied ceiling structure):.....105 lbs (47.6 kgs)
- 9 ft. (2.74 m) Dual 354 Lighting System (less customer supplied ceiling structure):.....107 lbs (48.5 kgs)

Torques:

- 8 ft. (2.44 m) Single 354 Lighting System: .....69 ft-lbs (94 N•m)
- 9 ft. (2.74 m) Single 354 Lighting System: .....69 ft-lbs (94 N•m)
- 8 ft. (2.44 m) Dual 354 Lighting System: .....136 ft-lbs (184 N•m)
- 9 ft. (2.74 m) Dual 354 Lighting System: .....137 ft-lbs (186 N•m)

NOTE
The illustrations in Figure 4 are for suggestion only. Midmark does not supply ceiling structures. Consult a structural engineer for the best solution for your situation.

The 354 lighting system requires a sturdy ceiling support structure to support the weight and the dynamic torque which will be applied to the support structure (See Figure 4).

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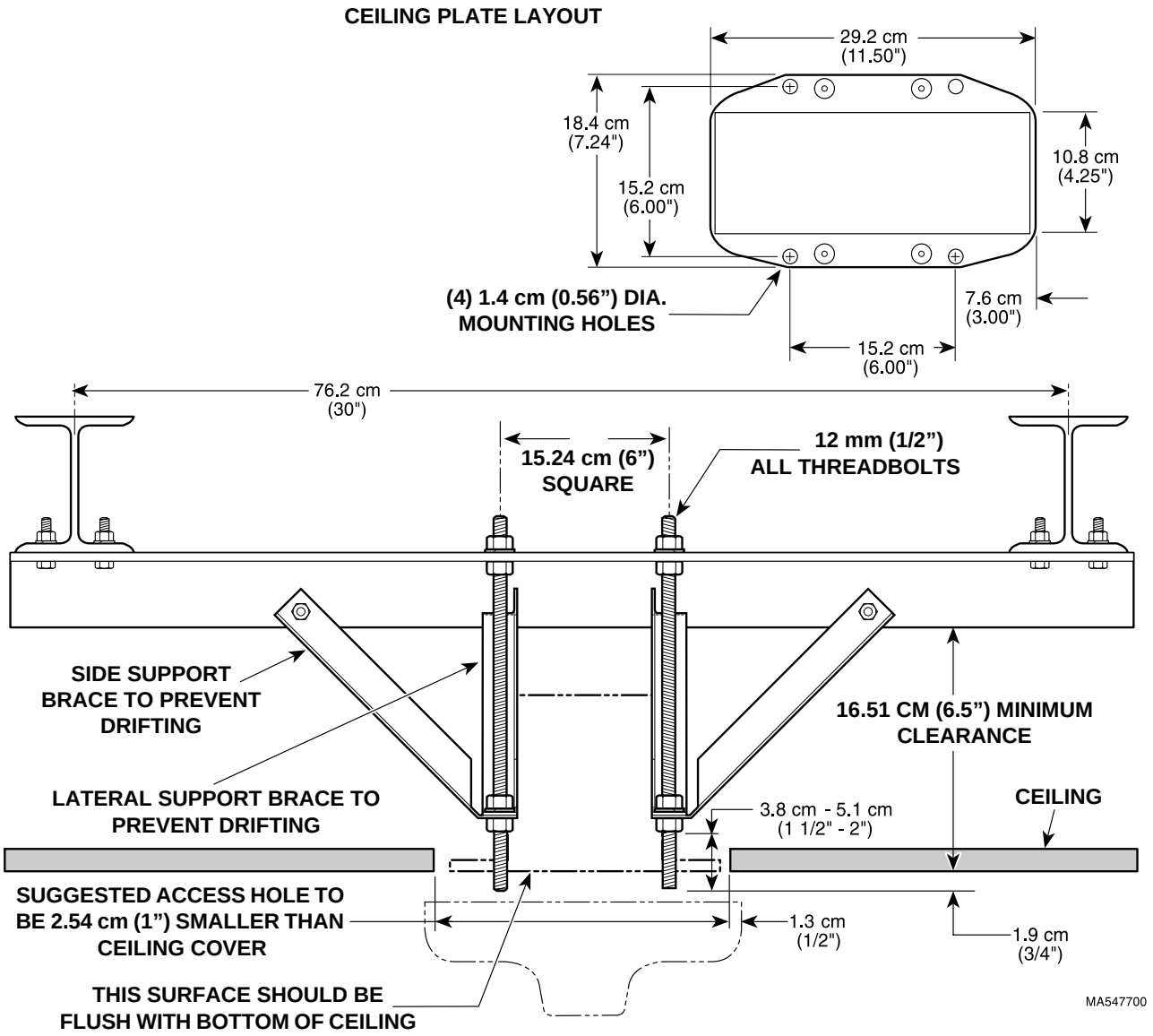

Figure 4. Suggested Ceiling Support Structure Installation

The 354 lighting system is engineered for ease of movement during positioning. The suspension assemblies and lighthead(s) will rotate with a minimum of force, provided the ceiling plate assembly is level and stays level. If, however, the ceiling support is weak and flexes, the weakness will have a negative impact on the operation of the tube assemblies during positioning. If the ceiling support structure flexes too much, the lighthead(s) will drift to the lowest point. Although the arms are equipped with brakes to prevent drift, the undesirable side effect of stiffer braking, is that the arm assemblies / lighthead(s) will be harder to move. For a set of tube assemblies to rotate without drift and a minimum amount of force, the ceiling plate assembly must not be allowed to deflect more than 1/16 in. (1.58 mm) over a 12 in. (30.5 cm) distance. The ceiling plate must be level and stay level when the tube assemblies are rotated in every position and all worst case scenarios (example: two sets of tube assemblies on one side). This means that the ceiling support structure must be braced in multiple directions.

The 354 lighting system comes in two different versions: an 8 ft. (2.44 m) version for a 8 ft. (2.44 m) ceiling and a 9 ft. (2.74 m) version for a 9 ft. (2.74 m) ceiling. The bottom of the ceiling plate assembly must be installed so it is flush with the finished surface of the facility's ceiling. See Figure 4. The ceiling cover is designed to fit up against the finished ceiling.

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ELECTROMAGNETIC INTERFERENCE

This product is designed and built to minimize electromagnetic interference with other devices. However, if interference is noticed between another device and this product, remove the interfering device from the room or wire this product into an isolated circuit.

WIRING INSTALLATION

The wiring, supplying power to the junction box of the 354 lighting system, must be supplied by the customer. The 354 lighting system requires 120 VAC input voltage. The wire should be a 2-conductor with ground, 14 gauge copper wiring, rated for 120 VAC. The customer supplied wiring must be connected to the junction box with some form of strain relief fitting, preferably a conduit fitting. Connect and route the wiring in accordance with local and national codes, using conduit where necessary. See wiring diagram, Figure 5.

JUNCTION BOX WIRING CONNECTIONS (SEE FIGURE 5)

WARNING
Make sure the power to the facility supplied wiring is turned "off" for the following step. Failure to do so could result in electrical shock, causing serious personal injury or death.

(1) Turn off facility power breaker so there ***is no*** power in customer supplied wiring.

(2) Loosen, but do not remove, four screws (1, Figure 7); then pull outward on box cover (2) and remove box cover from junction box (3).

(3) Install conduit fitting (customer supplied) in the knockout of the junction box (3).

(4) Feed the facility supplied wiring through the knockout in the junction box (3).

WARNING
Make sure the facility supplied wiring is not shorted to the junction box and does not touch wires during steps 5 and 6. Failure to do so could result in electrical shock, causing serious personal injury or death.

(5) Turn on facility power breaker so there ***is*** power in customer supplied wiring.

(6) Using a multimeter, measure the input voltage between black power lead and white neutral lead of customer supplied wiring. Record this voltage.

WARNING
Make sure the power to the facility supplied wiring is turned "off" for the following step. Failure to do so could result in electrical shock, causing serious personal injury or death.

(7) Turn "off" facility power breaker so there ***is no*** power in customer supplied wiring.

(8) If voltage measured in step 6 was 117.0 VAC or lower, connect the white neutral lead of customer supplied wiring to the terminal marked **N/114V** for single units ***or*** **N1/114V** or **N2/114V** for double units (see Figure 5).
If voltage measured in step 6 was between 117.1 and 123.0 VAC, connect the white neutral lead of customer supplied wiring to the terminal marked **N/120V** for single units ***or*** **N1/120V** or **N2/120V** for double units (see Figure 5).
If voltage measured in step 6 was 123.1 VAC or higher, connect the white neutral lead of customer supplied wiring to the terminal marked **N/126V** for single units ***or*** **N1/126V** or **N2/126V** for double units (see Figure 5).

(9) Connect the black power wire from customer supplied wiring to the terminal marked **L**.

(10) Connect the green/yellow earth ground wire from customer supplied wiring to the terminal marked with a ground symbol **G**.

CAUTION
Failure to properly connect and insulate wires in junction box could result in a short or electrical shock to personnel or improper system operation.
- Always use a strain relief (conduit fitting) between facility wiring and the junction box.
- Always connect the earth ground wires inside the junction box.
- Double Units-Always make certain the white jumper wire is properly positioned.

Figure 5 (Sheet 1 of 2). Wiring Diagram - Single Unit

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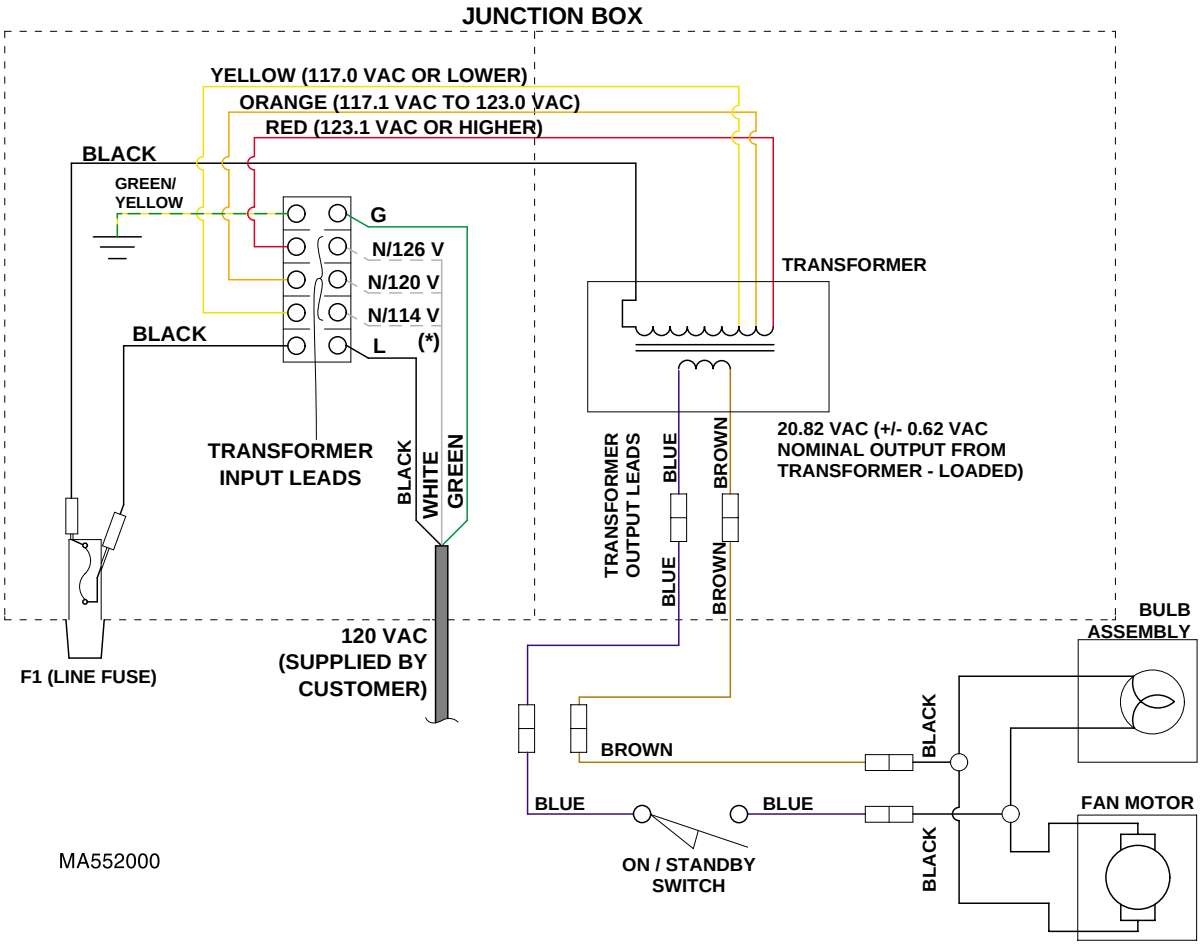

Figure 5 (Sheet 2 of 2). Wiring Diagram - Double Unit

(*) NOTE:

Select transformer input tap by measuring the input voltage. Then, connect the power lead (white wire) to one of the following according to the input voltage measured:
117.0 VAC or lower - Use the terminal marked N/114V.
117.1 VAC to 123.0 VAC - Use the terminal marked N/120V.
123.1 VAC or higher - Use the terminal marked N/126V.

(11) If light system is a dual light, the white jumper wire on the terminal block may need to be repositioned depending on the voltage measurement taken in step 6. If the voltage measurement was 117.0 VAC or lower, use white jumper wire to connect **N1/114V** to **N2/114V**. If the voltage measurement was 117.1 VAC to 123.0 VAC, keep white jumper wire where it is; connecting **N1/120V** to **N2/120V**. If the voltage measurement was 123.1 VAC or higher, use white jumper wire to connect **N1/126V** to **N2/126V**.

NOTE
It is especially important to perform steps 12 and 13 now if the ceiling is a drywall/plastered ceiling; these steps will not be able to be performed later.

(12) Feed brown and blue transformer output wires out of wire hole (7, Figure 7) in bottom of junction box.

(13) Position box cover (2) on junction box (3) and secure by tightening four screws (1).

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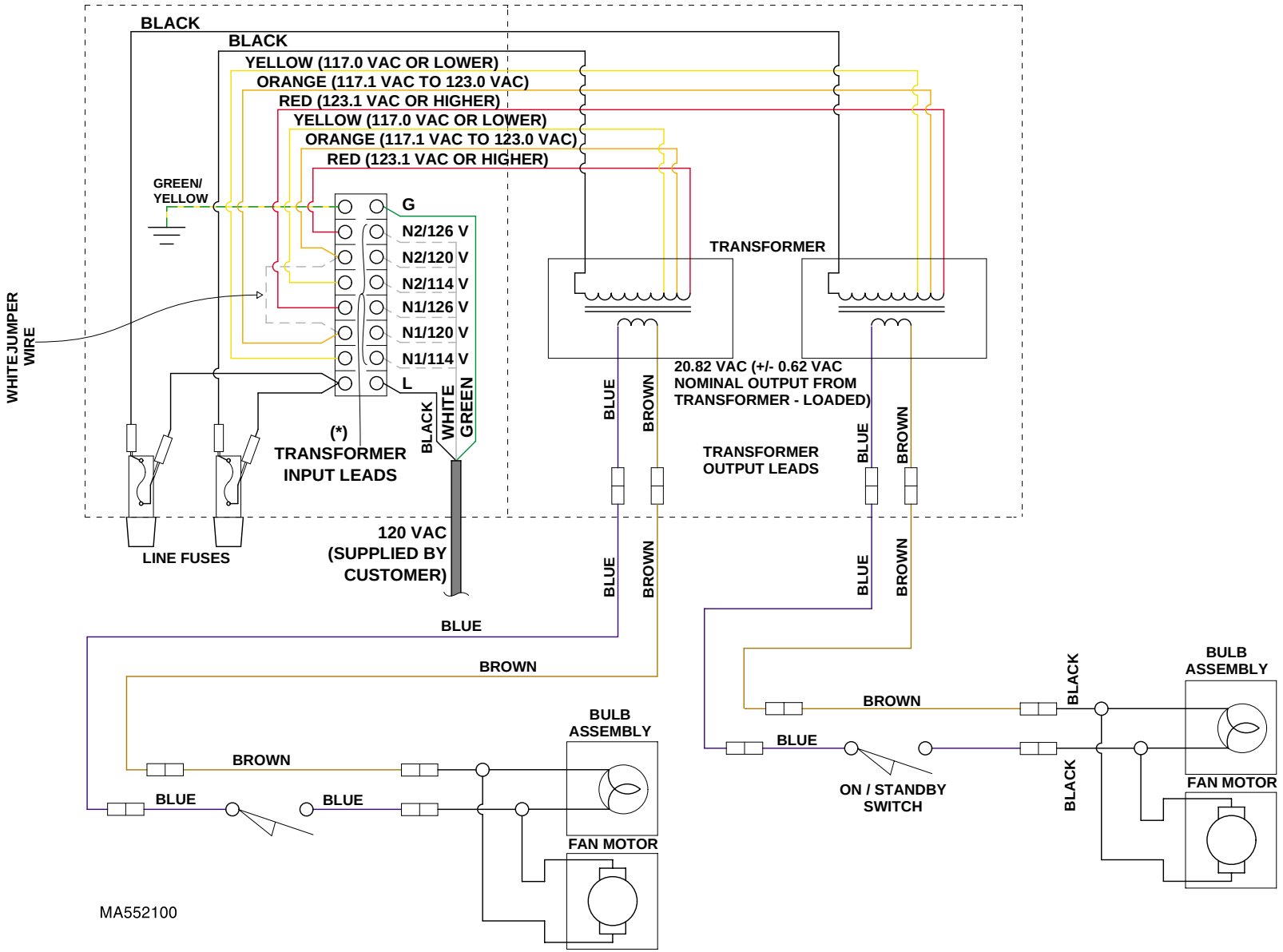

(*) NOTE:

Select transformer input tap by measuring the input voltage. Then, connect the power lead (white wire) to one of the following according to the input voltage measured:
117.0 VAC or lower - Use the terminal marked N1/114V or N2/114V.
117.1 VAC to 123.0 VAC - Use the terminal marked N1/120V or N2/120V.
123.1 VAC or higher - Use the terminal marked N1/126V or N2/126V.

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CEILING PLATE ASSEMBLY INSTALLATION

NOTE
The following step describes one typical way of mounting the ceiling plate assembly. However, this method may not work for all installations; if not, use the following procedure for guidance only.

(1) Install four 1/2” nuts (1, Figure 6) on four all-thread bolts (2) (not supplied).

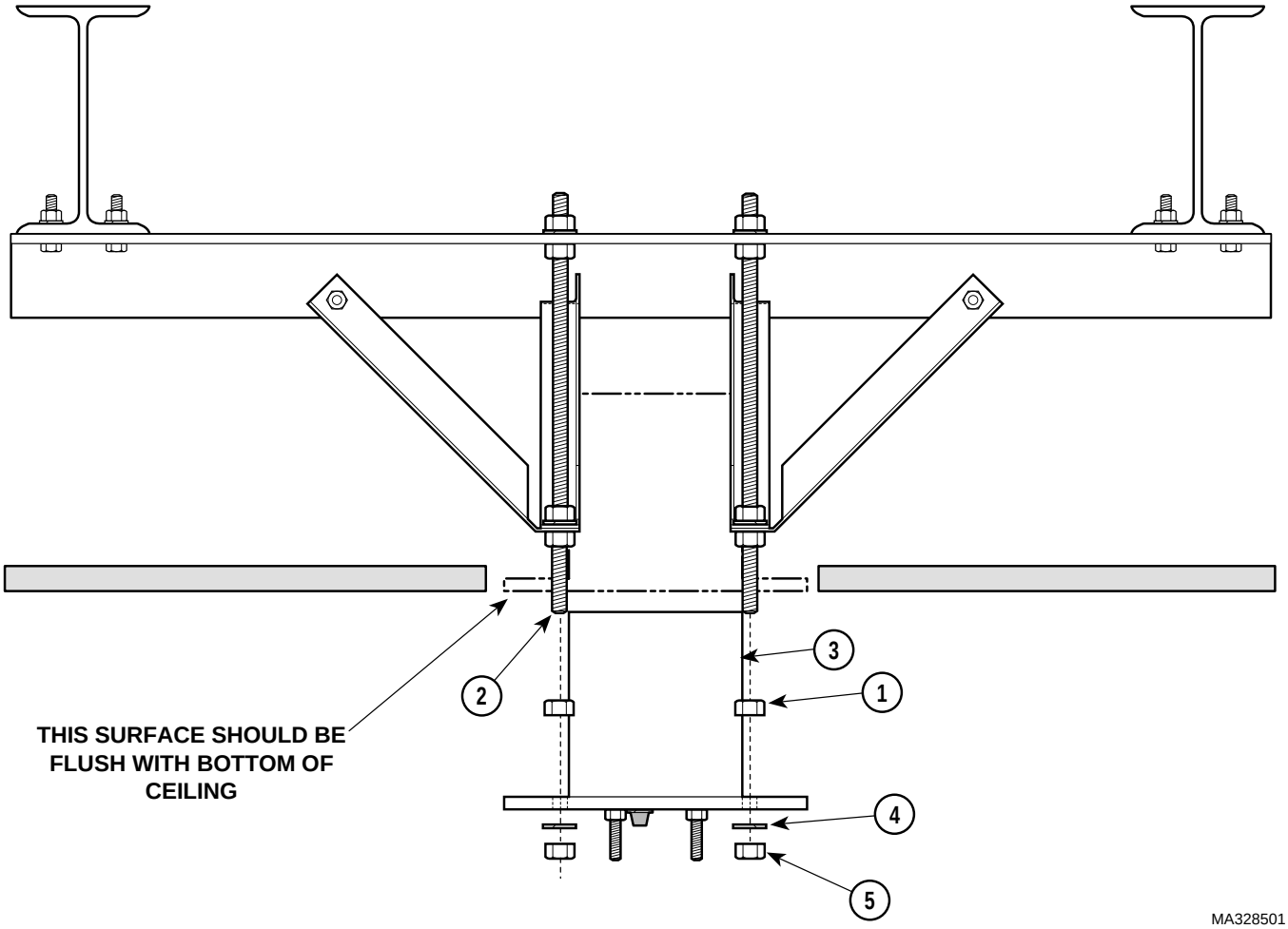

Figure 6. Suggested Ceiling Plate Assembly Installation

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(2) Install ceiling plate assembly (3) on four all-thread bolts (2) and secure with four 1/2" lockwashers (4) and 1/2" nuts (5).

NOTE
For the following step, make sure nuts (1) ***are not*** contacting the ceiling plate assembly (3). Otherwise, leveling of ceiling plate assembly with nuts (5) will not be possible.

(3) Adjust four nuts (5) until bottom of ceiling plate assembly (3) is flush with surface of ceiling.

WARNING
Failure to install nuts (5) so that there are at least two full threads visible below nuts, could result in unit falling.

(4) Use a level to check the levelness of ceiling plate assembly (3) in all directions. Adjust four nuts (5) as necessary until the ceiling plate assembly (3) is level in all directions and flush with surface of ceiling.

(5) Tighten nuts (1) against ceiling plate assembly (3); then recheck levelness of ceiling plate and readjust if necessary.

DOWN TUBE INSTALLATION

(1) Thread three 3/8" x 16 hex nuts (4, Figure 7) (supplied) onto three bolts (5) until they are handtight; then back off each nut one full turn.

(2) Position down tube (6) near wire hole (7).

(3) Connect brown wire (S2) from junction box (3) to brown wire (A) from down tube (6).

(4) Connect blue wire (S1) from junction box (3) to blue wire (B) from down tube (6).

(5) Install down tube (6) on three bolts (5) and secure with three 3/8" lockwashers (8) and 3/8" x 16 hex nuts (9) (supplied).

WARNING
Failure to install nuts (9) so that there are at least two full threads visible below nuts, could result in unit falling.

(4) Feed two wires (4) through top window (A) of down tube (2).

(6) Under normal circumstances, the down tube (6) should be level enough to provide drift-free operation. If, after complete assembly and operation of the light system, drifting is observed, use a protractor or level (C) to adjust nuts (9) until down tube (6) is vertical (+/- 0.5°); then tighten nuts (4).

(7) If light system is a dual light, repeat steps 1 through 6 for remaining down tube (6).

(8) Slide ceiling cover (10) onto down tube(s) (6).

(9) Attach ceiling cover (10) to ceiling plate (11) with four #10-24 x 3/4" screws (12) (supplied).

CROSS TUBE ASSEMBLY INSTALLATION

EQUIPMENT ALERT
When assembling a dual light system combination consisting of a model 354 mounted in combination with a model 355, special care must be taken to ensure that the proper transformer is used for each cross tube / lighthead assembly. Failure to do so may result in a blown fuse and / or bulb. The transformer output voltage is different for the two models. The model 354 transformer is labeled with part number 015-1206-00 and its secondary leads are marked S1 and S2. The Model 355 transformer is labeled with part number 015-1356-00 and its secondary leads are not marked.

(1) Slide ball pivot sleeve (1, Figure 8) onto down tube (2), making sure screw hole in sleeve is on the bottom.

(2) With ball pivot sleeve (1) positioned as high as possible on down tube (2), pull blue and brown wires (6) through top window (A) of down tube.

NOTE
There are three screw holes in cross tube (3); two of the holes are larger and have a courser thread. Use these two holes to secure cross tube assembly with screws (5). The other hole is for securing ball pivot sleeve.

(3) Align three screw holes; then insert pivot shaft of cross tube assembly (3) into down tube (2). Secure cross tube assembly in position with two #10-24 x 3/8" black oxide button head screws (5).

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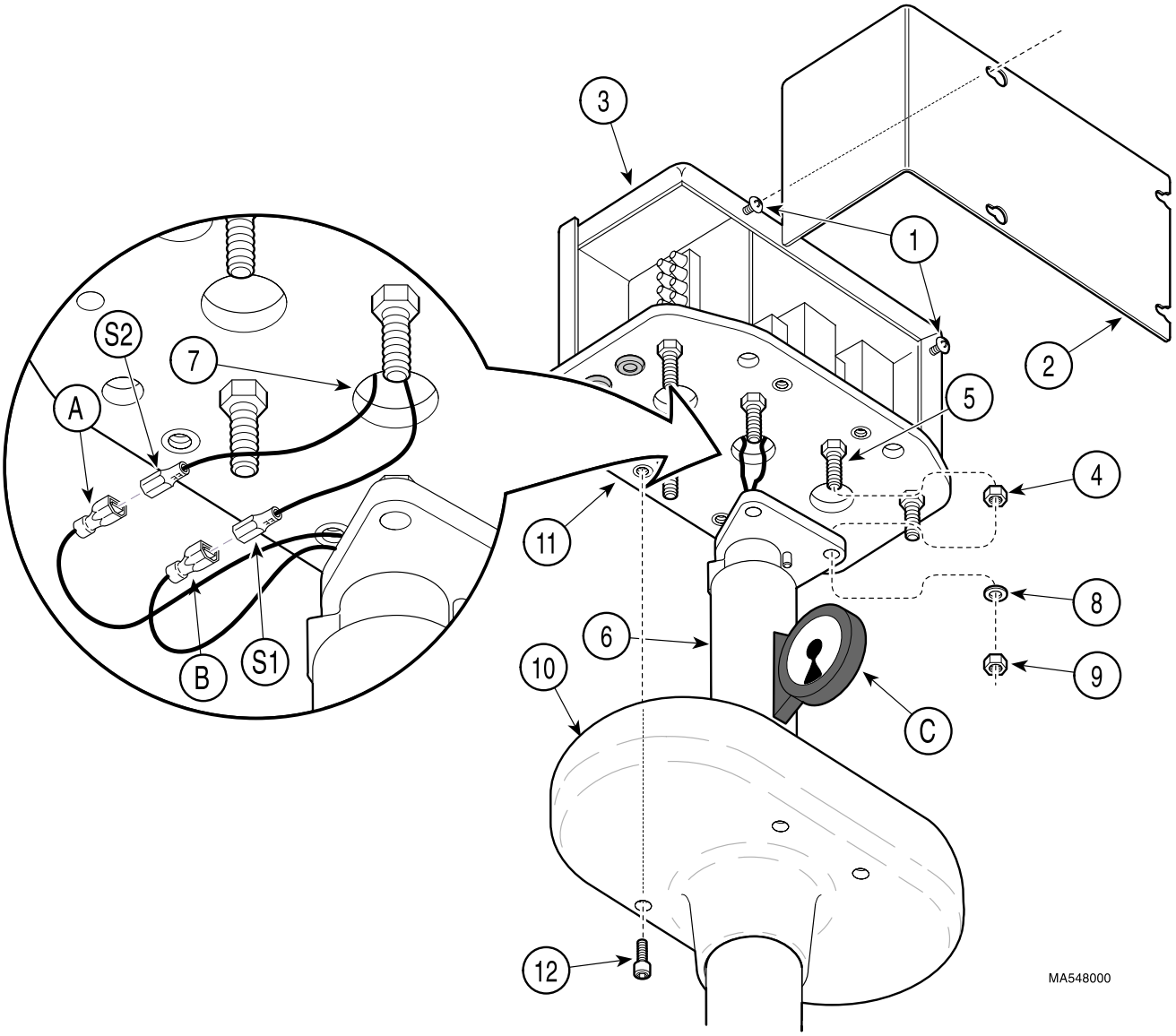

Figure 7. Down Tube Installation

(4) Feed two wires (4) through top window (A) of down tube (2).

(5) Connect brown wire (4) to brown wire (6) and blue wire (4) to blue wire (6). Push wires into top window (A).

(6) Slide ball pivot sleeve (1) down into position and secure with one #10-24 x 3/8" (New Units Only) pan head screw(7) (Refer to Page 5).

(7) If light system is a dual light, repeat steps 1 thru 6 for the remaining cross tube assembly. Special care must be taken when assembling a 354 / 355 combination unit as noted in the Equipment Alert.

HOUSING CAP INSTALLATION

(1) Install housing cap (2, figure 11) on ballast housing (3) and secure with screw (1).

OPERATIONAL TEST

(1) Turn the ON / STANDBY switch (1, Figure 9) to ON "I".

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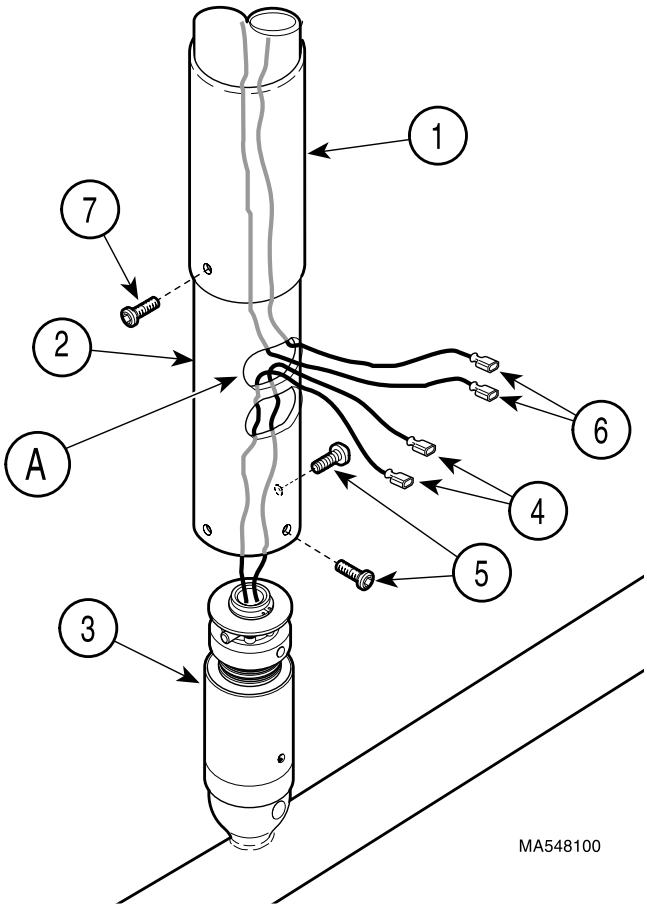

Figure 8. Cross Tube Assembly Installation

(3) Position the lighthead (2) 36 in. (91.4 cm) from a table and aim the light beam at the table.

(4) Observe. There should be a circular pattern of bright light on the table surface.

(5) Rotate the lighthead (2), lamp tube (3), cross tube (4), and down tube (5) through their range of motions as shown on the illustration. Release the lighthead at different positions.

(6) Observe. The lighthead (2) should be able to be positioned easily through the entire range of its motion. When the lighthead is released in any position, no drifting should occur at any axis.

(7) Adjust the brightness control lever (6) through its range of motion.

(8) Observe. The light beam should brighten / darken as the brightness control lever (6) is adjusted.

(9) Adjust the brightness control lever (6) to achieve maximum brightness, then adjust the beam size lever (7) through its range of motion.

(10) Observe. The light beam pattern should change from approximately 3 in. to 10 in. (7.6 to 25.4 cm) as the beam size lever (7) is adjusted.

(11) If any problems are discovered, refer to the troubleshooting guide for adjustment and repair tips.

TROUBLESHOOTING

TROUBLESHOOTING GUIDE

If any problems are discovered during the installation process, refer to the following table (Table 1) to determine the cause of the problem.

Table 1. Troubleshooting Guide

PROBLEM	POSSIBLE CAUSE	SOLUTION
no light from lighthead	*lighthead is on STAND-BY "⏻"*	turn ON / STANDBY switch to ON "I"
no light from lighthead, but ON / STANDBY switch is ON "I"	*bulb has burned out or has not been installed*	refer to bulb replacement procedure in this manual
	fuse in junction box is blown	inspect / replace the fuse located inside the ceiling cover
	no power to the junction box	check for facility power to the junction box
	transformer is malfunctioning	check for 20.8 VAC output at the transformer when it is under load.

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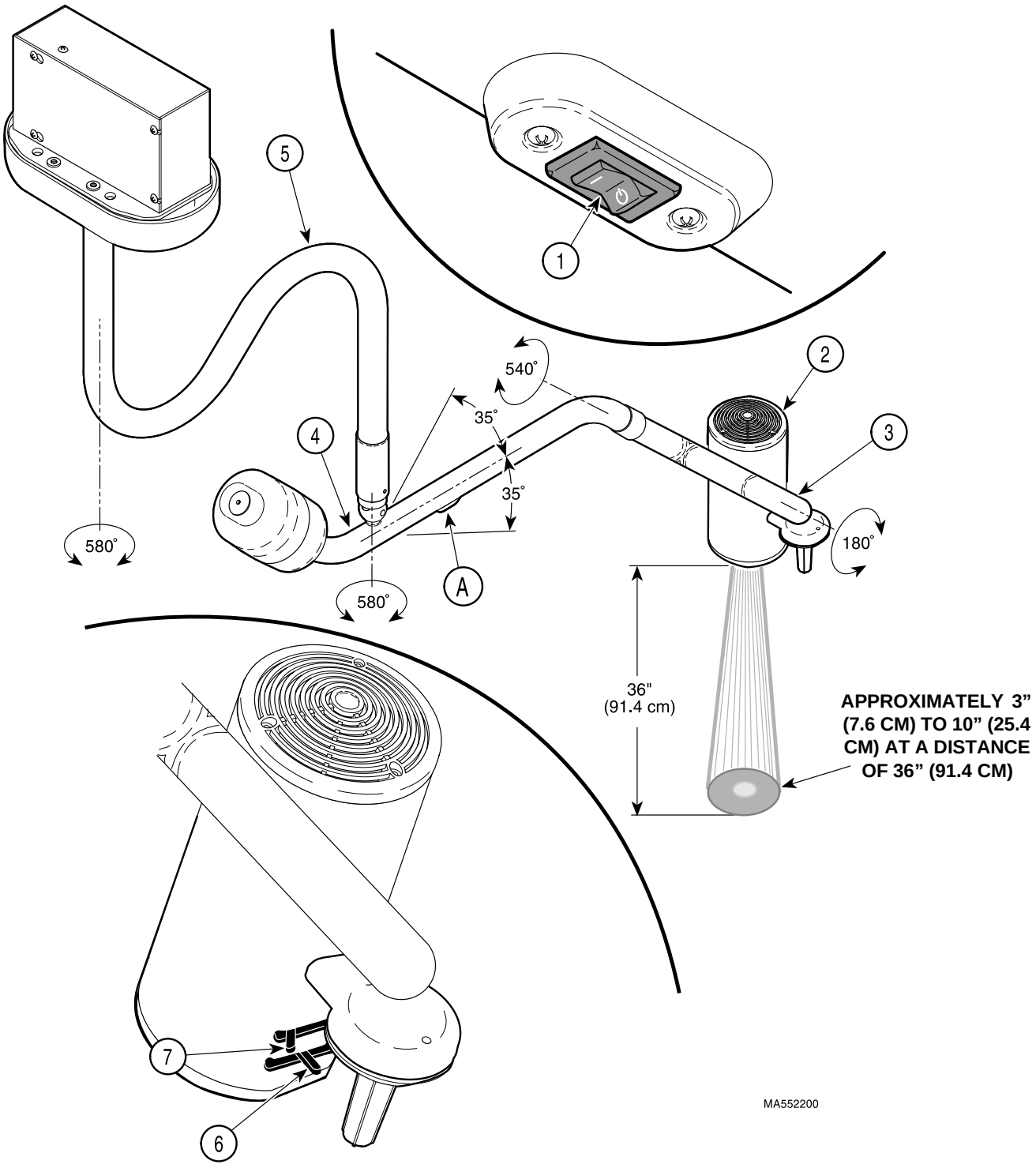

Figure 9. Operational Test

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Table 1. Troubleshooting Guide - Continued

no light from lighthead although the bulb and fuse were checked; lighthead flashes intermittently when lighthead or arms are moved	*circuit or wiring problem within arm assemblies, junction box, or other part of lighting system*	check all wiring connections. If problem cannot be repaired, call Midmark Technical Support: 1-800-Midmark.
down tube does not rotate freely or drifts when released in desired position	*improper installation of ceiling plate (deflects too much or is not level)*	check for excessive flexing of ceiling support structure and / or check if ceiling plate is level. Readjust as necessary.
lamp tube does not rotate freely or drifts when released in desired position	*brake tension needs adjusted*	call Midmark Technical Support: 1-800-Midmark
cross tube rotates (at ball pivot joint) too stiffly or drifts when released in desired position	*ball pivot joint tension needs to be adjusted or cross tube counterbalance needs adjusted*	refer to ball pivot joint tension adjustment procedure in this manual. If proper tension cannot be achieved, refer to cross tube counterbalance adjustment procedure in this manual and then repeat main pivot joint tension adjustment. If problem cannot be repaired, call Midmark Technical Support: 1-800-Midmark
lighthead does not rotate freely at lamp tube or drifts when released in desired position	*brake needs adjustment*	call Midmark Technical Support: 1-800-Midmark

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ADJUSTMENTS

BALL PIVOT TENSION ADJUSTMENT

(1) Remove screw (1, Figure 10) and slide ball pivot sleeve (2) up out of way.

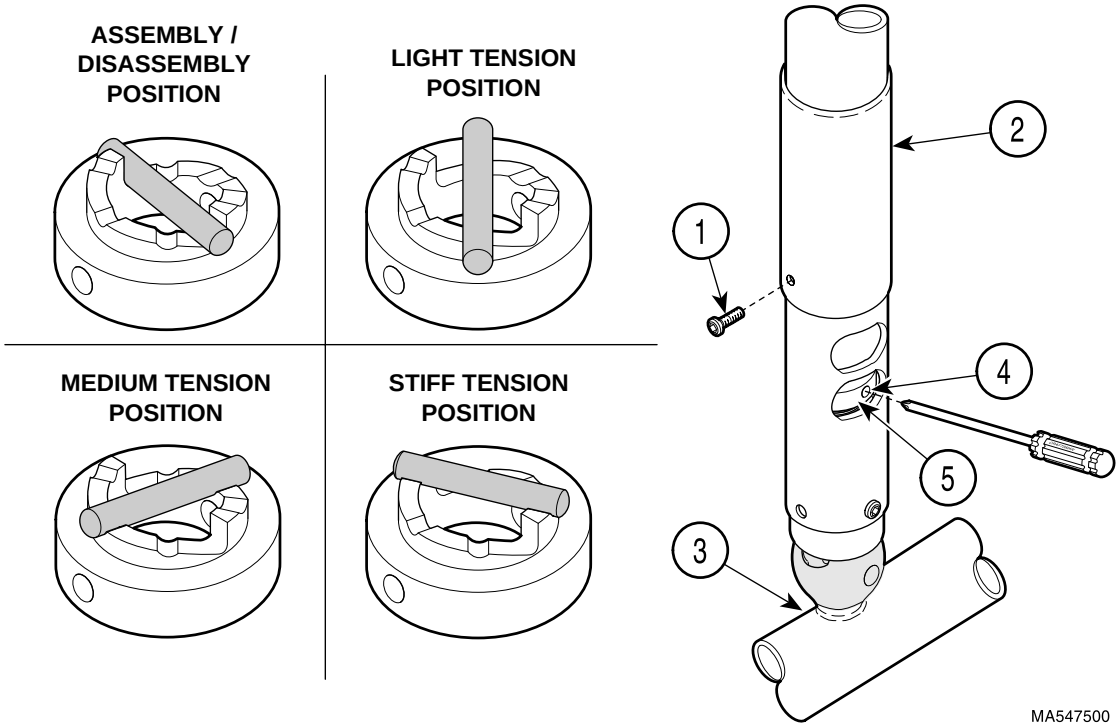

Figure 10. Ball Pivot Joint Tension Adjustment

(2) Rotate cross tube (3) until adjustment hole (4) appears in the adjustment window opening.

NOTE
There are three settings which the ball pivot cam (5) can be set for: light tension, medium tension, or stiff tension (see Figure 10). These settings may be changed according to the operator's preference.

(3) Insert screwdriver into adjustment hole (4). Then, using the screwdriver, rotate ball pivot cam (5) to the desired tension setting.

(4) Remove the screwdriver and move the cross tube (3) about the ball pivot joint in a circular motion and up and down motion to ensure the setting is the one desired. Move the cross tube (3) to a horizontal position and release it. The cross tube should not drift in any direction. If it does, a higher tension setting is required. Repeat steps 3 and 4 until the desired tension adjustment is achieved with no drifting of the cross tube. If a satisfactory tension adjustment cannot be achieved, perform the cross tube counterbalance adjustment procedure and then repeat the ball pivot joint tension adjustment procedure.

(5) Slide ball pivot sleeve (2) down into position and secure with screw (1).

CROSS TUBE COUNTERBALANCE ADJUSTMENT

(1) Remove screw (1, Figure 10) and slide ball pivot sleeve (2) up out of way.

(2) Rotate cross tube (3) until adjustment hole (4) appears in the adjustment window opening.

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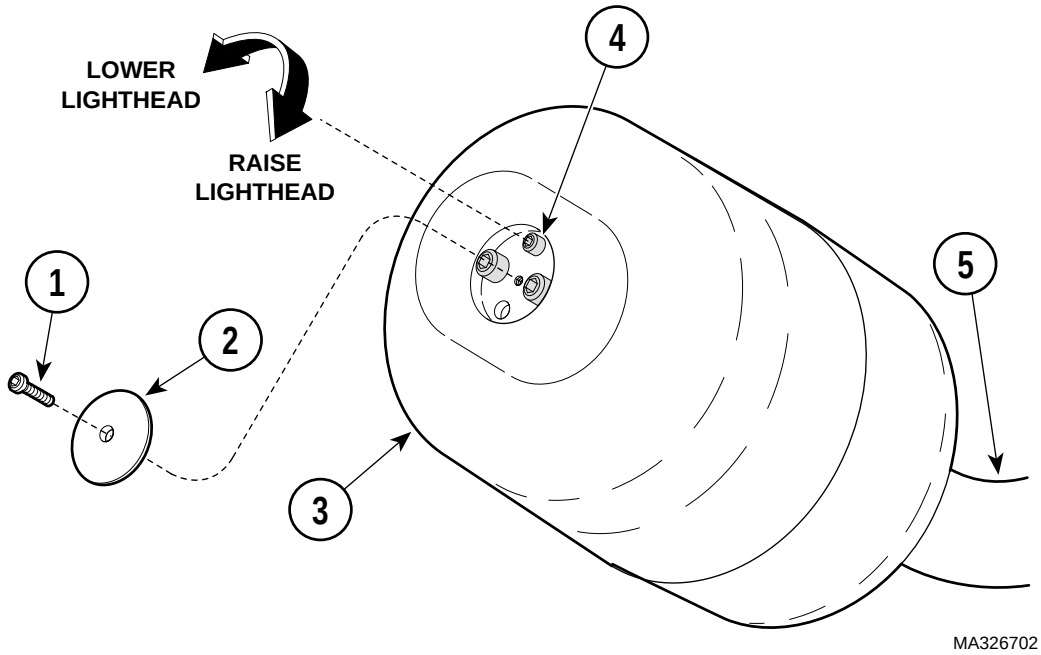

Figure 11. Cross Tube Counterbalance Adjustment

(3) Insert screwdriver into adjustment hole (4). Then, using the screwdriver, rotate ball pivot cam (5) to the assembly / disassembly setting. Remove screwdriver.

(4) Remove screw (1, Figure 11) and housing cap (2) from ballast housing (3).

NOTE
One way to determine if the cross tube is balanced properly is to raise the cross tube above horizontal, release it, and observe where it stops. Then, lower the cross tube below horizontal plane, release it, and observe where it stops. The cross tube should return to the horizontal position and remain there; if it does, the cross tube counterbalance is adjusted properly.

Turning screw (4) in clockwise direction will raise the lighthead end of cross tube. Turning screw (4) in counterclockwise direction will lower the lighthead end of cross tube.

(5) Adjust screw (4) until cross tube (5) balances in a horizontal position.

(6) Install housing cap (2) on ballast housing (3) and secure with screw (1).

NOTE
It is recommended that you start with the light setting and then proceed to the medium or stiff setting only if necessary to prevent drifting.

(7) Insert screwdriver into adjustment hole (4, Figure 10). Then, using the screwdriver, rotate ball pivot cam (5) to the light, medium, or stiff setting as desired by the operator(s). Remove screwdriver.

(8) Slide ball pivot sleeve (2) down into position and secure with screw (1).

CALLING FOR SERVICE

If you are having a problem or have a question, refer to the inside front cover of this manual and call your dealer. Make sure that you have the information that is highlighted on the inside front cover of this manual available. If you can't resolve your question or problem with your dealer, call the following number:

1-800-Midmark (1-800-643-6275) or 937-526-3662
8:00 a.m until 5:00 p.m. (Eastern Standard Time in U.S.)
Monday through Friday, except for standard U.S. holidays.

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LIMITED WARRANTY

SCOPE OF WARRANTY
Midmark Corporation (“Midmark”) warrants to the original purchaser its new Alternate Care products and components (except for components not warranted under “Exclusions”) manufactured by Midmark to be free from defects in material and workmanship under normal use and service. Midmark’s obligation under this warranty is limited to the repair or replacement, at Midmark’s option, of the parts or the products the defects of which are reported to Midmark within the applicable warranty period and which, upon examination by Midmark, prove to be defective.

APPLICABLE WARRANTY PERIOD
The applicable warranty period, measured from the date of delivery to the original user, shall be one (1) year for all warranted products and components.

EXCLUSIONS
This warranty does not cover and Midmark shall not be liable for the following: (1) repairs and replacements because of misuse, abuse, negligence, alteration, accident, freight damage, or tampering; (2) products which are not installed, used, and properly cleaned as required in the Midmark “Installation” and or “Installation / Operation Manual for this applicable product. (3) products considered to be of a consumable nature; (4) accessories or parts not manufactured by Midmark; (5) charges by anyone for adjustments, repairs, replacement parts, installation, or other work performed upon or in connection with such products which is not expressly authorized in writing in advance by Midmark.

EXCLUSIVE REMEDY
Midmark’s only obligation under this warranty is the repair or replacement of defective parts. Midmark shall not be liable for any direct, special, indirect, incidental, exemplary, or consequential damages or delay, including, but not limited to, damages for loss of profits or loss of use.

NO AUTHORIZATION
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NOTES:

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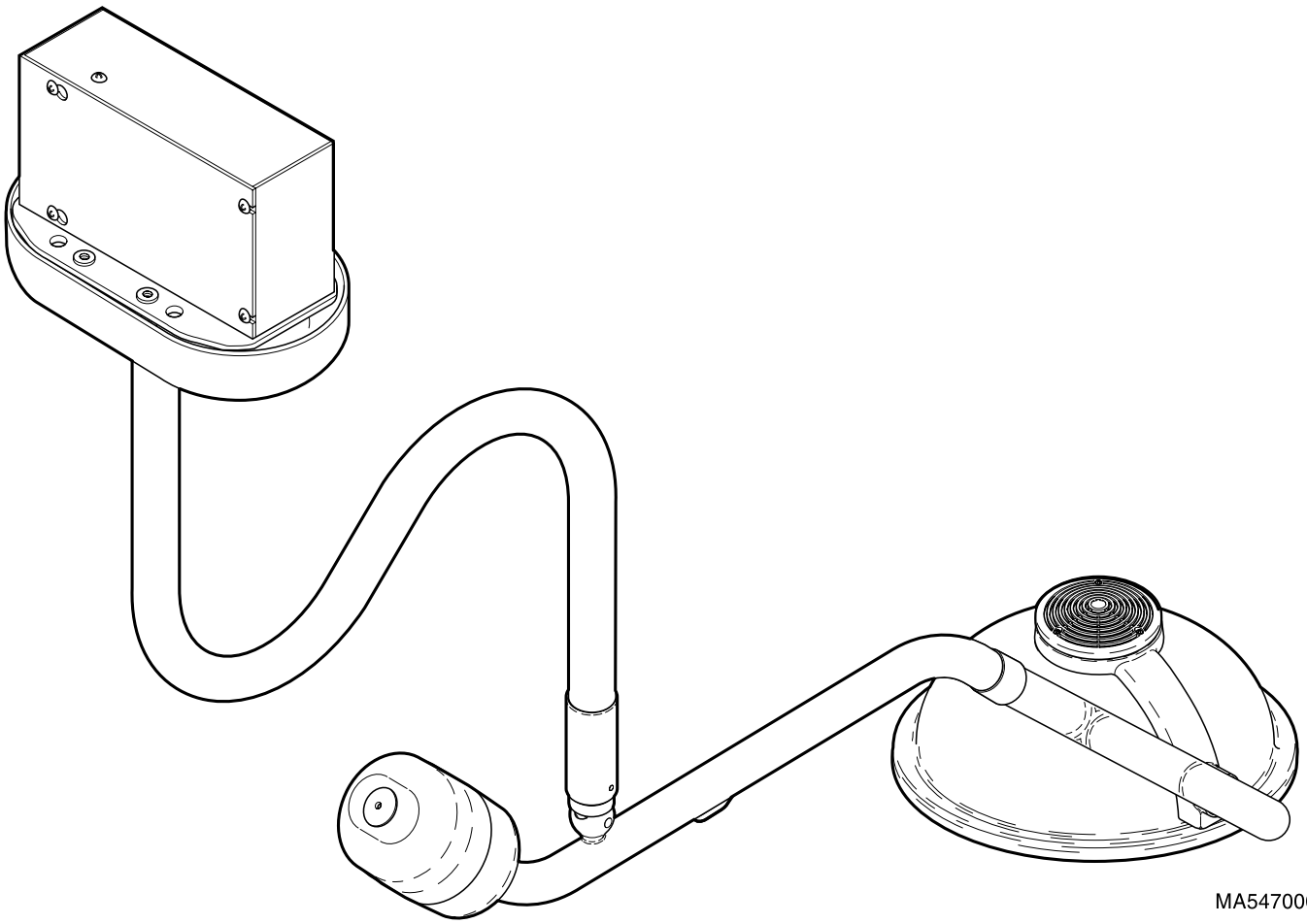
Installation Manual

355 Lighting System



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Owner's Product Identification

(information that you'll need to provide for servicing - key information is highlighted)

Date of Purchase	Serial Number(s) - Dual light systems will have a serial number on each down tube
Name of Owner/Facility/Department	Model Number
Name of Authorized Dealer	Telephone # of Authorized Dealer
Address of Authorized Dealer	

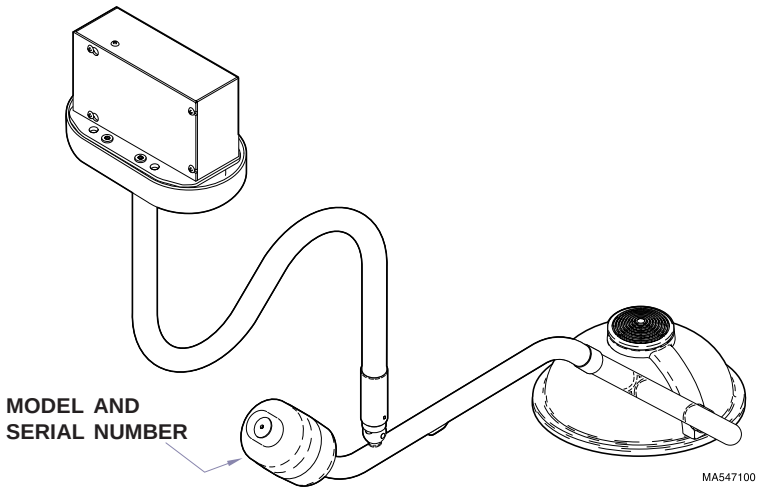

Figure 1. Model Number / Serial Number

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SCOPE AND PURPOSE OF THIS MANUAL

This manual covers complete instructions for the installation of the 355 Lighting System and is intended to be used by personnel involved in the installation of the 355 Lighting System. The Operation Manual (Part No. 003-1063-00) for the 355 Lighting System is a separate document and is intended for persons who will operate the 355 Lighting System.

SAFETY INSTRUCTIONS

The primary concern of Midmark is that this equipment be operated and maintained with the safety of the users in mind. To assure safer and more reliable operation, do the following: (1) Read this manual before installing your light assembly; (2) Assure that appropriate personnel are informed on the contents of this manual--this is the responsibility of the purchaser; (3) Be sure that you understand the instructions contained in this manual before attempting to install this light assembly; (4) Be sure that you have read and understand the instructions contained in the Operation Manual (a separate document) before attempting to operate this equipment.

EXPLANATION OF SAFETY SIGNALS AND NOTES

Throughout this manual, there are danger, warning, caution, equipment alerts, and notes that call attention to particular procedures. The signal words and notes are used as follows:

DANGER
Indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations.

WARNING
Indicates a potentially hazardous situa tion, which, if not avoided, could result in death or serious injury.

CAUTION
Indicates a potentially hazardous situa tion, which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

EQUIPMENT ALERT
Indicates an imminently or potentially hazardous situation, which, if not avoided, will or may result in serious, moderate, or minor equipment damage.

NOTE
Note is used to amplify an operating procedure, practice, or condition.

Indicates that the unit is rated: Type B, Applied Part.

Indicates a protective earth ground.

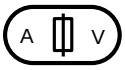
Indicates that the operator's manual should be consulted for important information.

Indicates the product is fragile; do not handle roughly.

Indicates the proper shipping orientation for the product.

Indicates the presence of a dangerous voltage / shock hazard.

Indicates the product must be kept dry.



Indicates a fuse rating specification.

Indicates a hot surface.

Transportation and Storage Conditions

- Ambient Temperature Range: .....-30°C to +60°C (-22°F to 140°F)
- Relative Humidity: .....10% to 90% (non-condensing)
- Atmospheric Pressure: .....500 hPa to 1060 hPa (0.5 bar to 1.06 bar)
- This product contains glass, so it should be transported and stored with care to limit vibration and shocks.

GENERAL INFORMATION

Lighting System

The 355 lighthead assembly is a fixed-focus, faceted reflector lighthead. The faceted reflector design of the lighthead provides excellent cavity penetration, while also controlling shadows from light-blocking objects. The design also results in bright, even distribution of light.

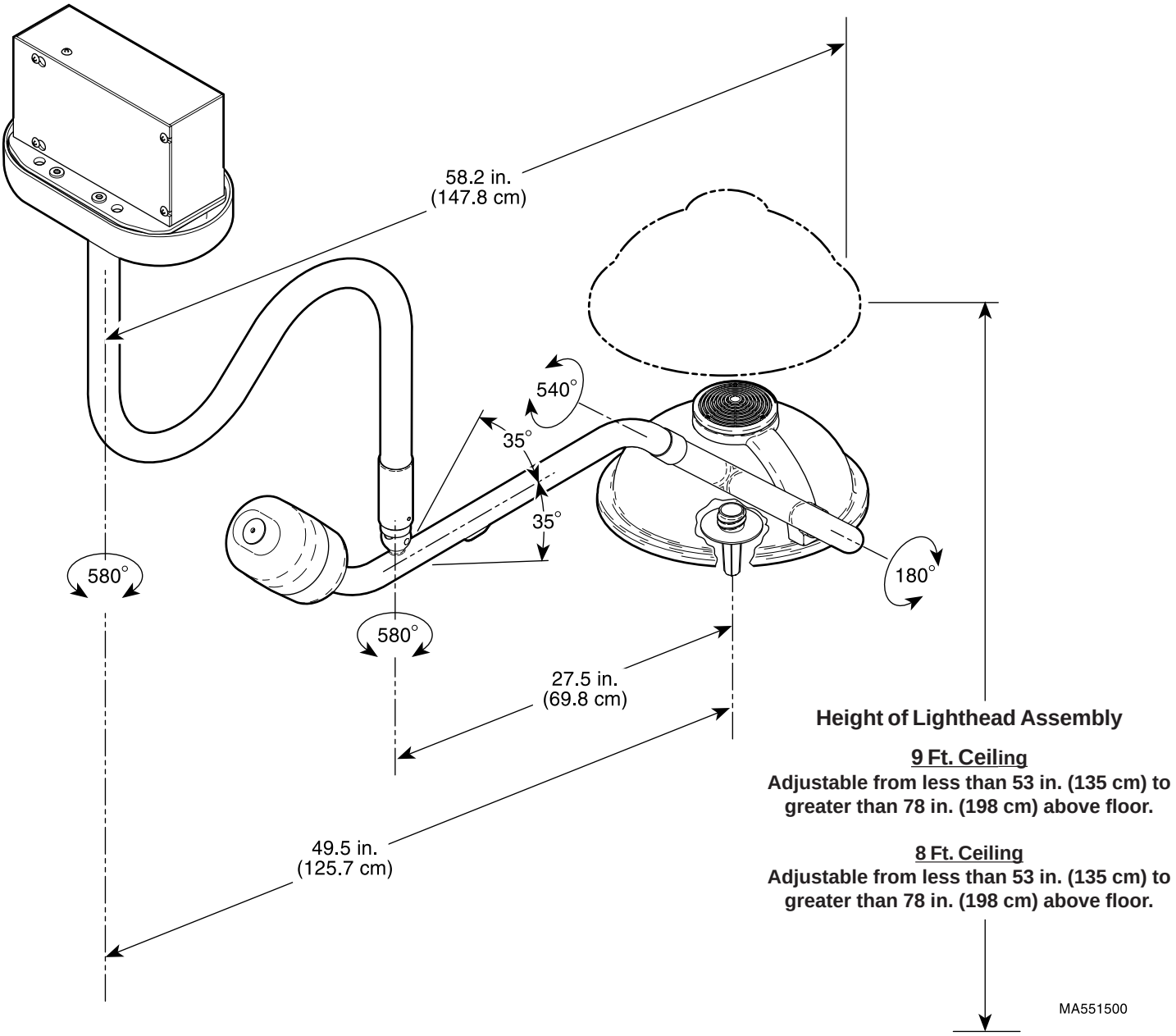


Figure 1. Specifications

The individual beams of light are arranged to provide an evenly illuminated 8 inch diameter beam at a distance of 36 inches. The peak illumination at 36 inches is 4,000 fc (43,000 lux). The optical system filters out most of the infrared heat from the prefocused pattern of light.

The plastic handle can be easily removed for sterilization or it accepts a Devon EZ Handle™ without requiring an awkward adapter. The lighthead is made with a color molded, lightweight polymer resulting in a very lightweight lighthead which is easy to position. The optical system is powered by a 24 VAC, 100 Watt bulb.

The arm assemblies (suspension system) have been precisely designed, assembled, and balanced so that the lighthead can be positioned with minimal force with no drifting occuring. In addition, the three pivots with 540º of rotation make the positioning of the lighthead easy and flexible.

Specifications

See Figure 1 and Table 1 for specifications on the 355 Lighting System.

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Table 1. Model 355 Specifications

Beam diameter @ 36 inches:	8" (defined by 20% of peak illumination)
Bulb:	100 W halogen lamp, 24 VAC
Color temperature:	4,200K
Diameter of lighthead:	17"
Focal length:	36"
Illumination:	4,000fc, 43,000 lux
Power requirement:	120 VAC, 1.25 A, single phase
Rotation of lighthead:	180° rotation at lamp tube connection
Rotation of lamp tube:	540° rotation at cross tube connection
Rotation of cross tube:	580° rotation at down tube connection
Vertical movement of cross tube:	-35° to +35° vertical movement
Rotation of down tube:	580° rotation at ceiling plate connection
Weight of 8 ft (2.44 m) single light assembly:	59 lbs. (26.8 kgs.)
Weight of 9 ft (2.74 m) single light assembly:	60 lbs. (27.2 kgs.)
Weight of 8 ft (2.44 m) dual light assembly:	105 lbs. (47.6 kgs.)
Weight of 9 ft (2.74 m) dual light assembly:	107 lbs. (48.5 kgs.)
Certifications:	CLASSIFIED C UL US Classified by Underwriters Laboratories Inc. with respect to electric shock, fire, and mechanical hazards only in accordance with UL2601-1 and CAN/CSA C22.2, No.601.1. **ISO-9001 Certified**
Classifications:	Class 1, Type B applied part, Ordinary Equipment, Continuous Operation
Fuse Rating:	1.6 A, 250 V, Type T, low breaking capacity, 5mm x 20mm, IEC 127-2/3

Equipment not suitable for use in the presence of a flammable anesthetic mixture with air, oxygen, or nitrous oxide.

355 LIGHTING SYSTEM INSTALLATION

Unpacking

NOTE

Below is a list of all the items which should be included in the shipping box(es). The first quantity indicates the number of items which should be present for a single lighting assembly while the second quantity indicates the number of items which should be present for a dual lighting assembly (Refer to Figure 2).

1. Cut banding and remove box lid from box.
2. Remove one/two cross tube/lighthead assembly (1, Figure 2) and inspect.
3. Remove one/two down tube assembly (2) and inspect.
4. Remove one/two cotton bag (3) and inventory contents; the following items should be included:

3a. Four #10-24 x 3/4" socket cap screws
3b. Two/four #10-24 x 3/8" black oxide button head screws
3c. One/two #8-32 x 3/8" phillips head screw **(Used on Model Serial # MS1000 *thru* MS4246 & MT1000 *thru* MT1090)**
3d. Six/twelve 3/8"-16 hex nuts
3e. Three/six 3/8" lockwashers
3f. One/two 100 W Halogen bulb
3g. One/two housing caps
3h. One/two #10-24 x 5/8" zinc plated button head screws
3i. One/two #10-24 x 3/8" pan head screw **(Used on Model Serial # MS4247 & MT1091 *thru* Present)**

[Fastener Installation Kit (002-0695-00) includes all components listed above.]

5. Remove one ceiling plate assembly (4) and inspect.
6. Remove one/two sterilizable handle (5) and inspect.
7. Remove one ceiling cover (6) and inspect.

Recommended Ceiling Mounting Locations (For Dental and Oral Surgery Applications)

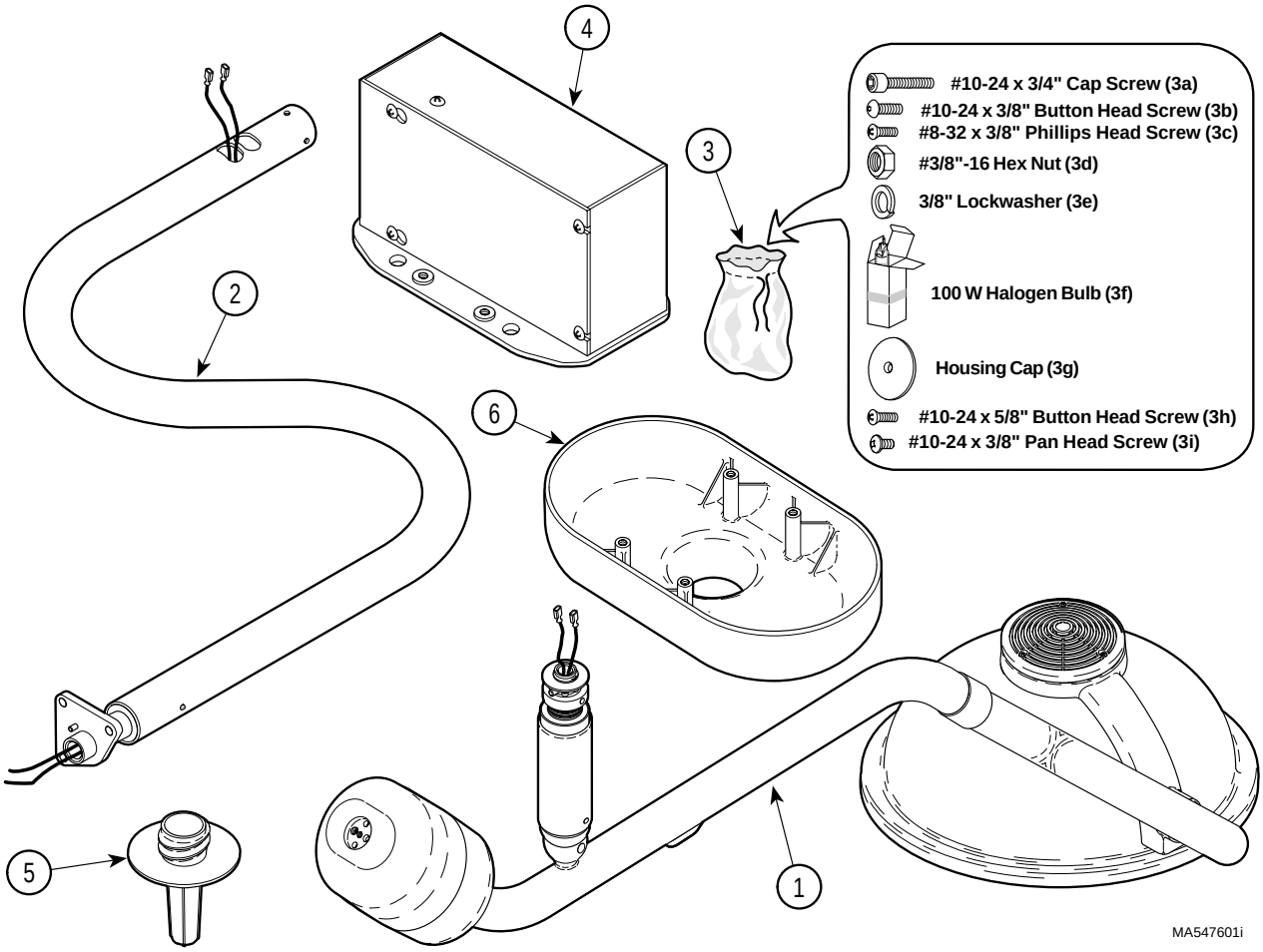


Figure 2. Components Unpacking and Inventory

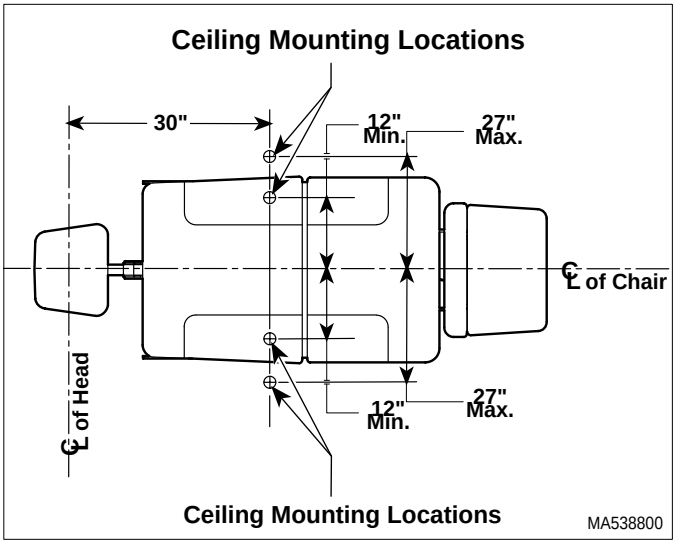


Figure 3. Recommended Ceiling Mounting Locations (For Dental and Oral Surgery Applications)

See Figure 3 for recommended ceiling mounting locations. These locations allow the lighthead to be positioned over any portion of the patient's body without running into a physical arm restriction; mounting the light system on the centerline of the table or headrest will result in some areas of the patient's body not being able to be illuminated by the lighthead. Also, the light system should be mounted on the opposite side of the table as the dentist or oral surgeon's work position, so the light system is not hanging above their head.

Ceiling Support Structure Installation

Weights:

- 8 ft (2.44 m) Single 355 Lighting System (less customer supplied ceiling structure): ..... 59 lbs (26.8 kgs)
- 9 ft (2.74 m) Single 355 Lighting System (less customer supplied ceiling structure): ..... 60 lbs (27.2 kgs)
- 8 ft (2.44 m) Dual 355 Lighting System (less customer supplied ceiling structure): ..... 105 lbs (47.6 kgs)
- 9 ft (2.74 m) Dual 355 Lighting System

(less customer supplied ceiling structure):
107 lbs (48.5 kgs)

Torques:

- 8 ft (2.44 m) Single 355 Lighting System: ..... 69 ft-lbs (94 N•m)
- 9 ft (2.74 m) Single 355 Lighting System: ..... 69 ft-lbs (94 N•m)
- 8 ft (2.44 m) Dual 355 Lighting System: ..... 136 ft-lbs (184 N•m)
- 9 ft (2.74 m) Dual 355 Lighting System: ..... 137 ft-lbs (186 N•m)

NOTE

The illustrations in Figure 4 are for suggestion only. Midmark does not supply ceiling structures. Consult a structural engineer for the best solution for your situation.

The 355 Lighting system requires a sturdy ceiling support structure to support the weight and the dynamic torque which will be applied to the support structure (See Figure 4).

The ceiling support structure must be strong enough to uphold the weight of the system and support the rotating suspension arms and lighthead(s) without deflection.

The 355 lighting system is engineered for ease of movement during positioning. The arm assemblies and lightheads(s) will rotate with a minimum of force, provided the arm assemblies are leveled and stay level. If, however, the ceiling support is weak and flexes, the weakness will have a negative impact on the operation of the arm assemblies during positioning.

If the ceiling support structure flexes too much, the lighthead(s) will drift to the lowest point. Although the arms are equipped with brakes to prevent drift, the

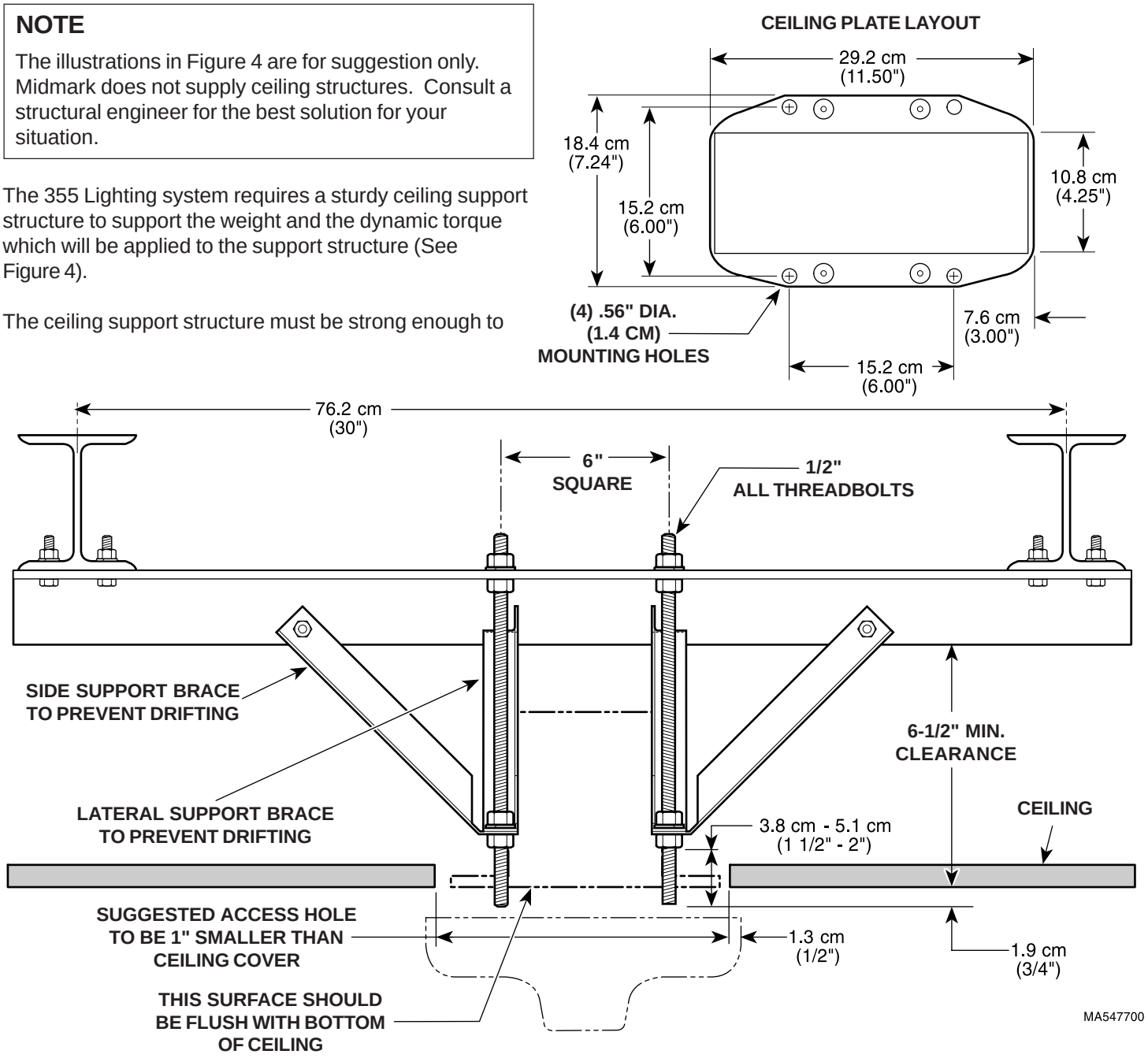

CEILING PLATE LAYOUT
29.2 cm (11.50")
18.4 cm (7.24")
15.2 cm (6.00")
10.8 cm (4.25")
(4) .56" DIA. (1.4 CM) MOUNTING HOLES
7.6 cm (3.00")
15.2 cm (6.00")
76.2 cm (30")
6" SQUARE
1/2" ALL THREADBOLTS
SIDE SUPPORT BRACE TO PREVENT DRIFTING
LATERAL SUPPORT BRACE TO PREVENT DRIFTING
6-1/2" MIN. CLEARANCE
CEILING
3.8 cm - 5.1 cm (1 1/2" - 2")
SUGGESTED ACCESS HOLE TO BE 1" SMALLER THAN CEILING COVER
1.3 cm (1/2")
1.9 cm (3/4")
THIS SURFACE SHOULD BE FLUSH WITH BOTTOM OF CEILING
MA547700

Figure 4. Suggested Ceiling Support Structure Installation

undesirable side effect of stiffer braking, is that the arm assemblies / lighthead(s) will be harder to move. For a set of arm assemblies to rotate without drift and a minimum amount of force, the ceiling plate assembly must not be allowed to deflect more than 1/16" over a 12" distance. The ceiling plate must be level and stay level when the arm assemblies are rotated in every position and all worst case scenarios (example: two sets of arm assemblies on one side). This means that the ceiling support structure must be braced in multiple directions.

The 355 lighting system comes in two different versions: an 8 foot version for an 8 foot ceiling and a 9 foot version for a 9 foot ceiling. The bottom of the ceiling plate assembly must be installed so it is flush with the finished surface of the facility's ceiling. See Figure 4. The ceiling cover is designed to fit up against the finished ceiling.

Electromagnetic Interference

This product is designed and built to minimize electrmagnetic interference with other devices. However, if interference is noticed between another device and this product, remove the interfering device from the room or wire this product into an isolated circuit.

Wiring Installation

The wiring, supplying power to the junction box of the 355 lighting system, must be supplied by the customer. The 355 lighting system requires 120 VAC input voltage. The wire should be 2-conductor with ground, 14 gauge copper wiring, rated for 120 VAC. The customer supplied wiring must be connected to the junction box with some form of strain relief fitting, preferably a conduit fitting. Connect and route the wiring according to state and local codes, using conduit where necessary. See wiring diagram, Figure 5.

Junction Box Wiring Connections (See Figure 5)

WARNING
Make sure facility supplied wiring is turned to off for the following step. Failure to do so could result in electrical shock causing serious personal injury or death.

1. Turn off facility power breaker so there ***is no*** power in customer supplied wiring.

2. Loosen four screws (1, Figure 7); then pull outward on box cover (2) and remove from junction box (3).

3. Install conduit fitting (customer supplied) in the knockout of the junction box (3).

4. Feed the facility supplied wiring through the knock-out in the junction box (3).

WARNING
Make sure facility supplied wiring is not shorted to junction box and do not touch wires during steps 5 and 6. Failure to do so could result in electrical shock causing serious personal injury or death.

5. Turn on facility power breaker so there ***is*** power in customer supplied wiring.

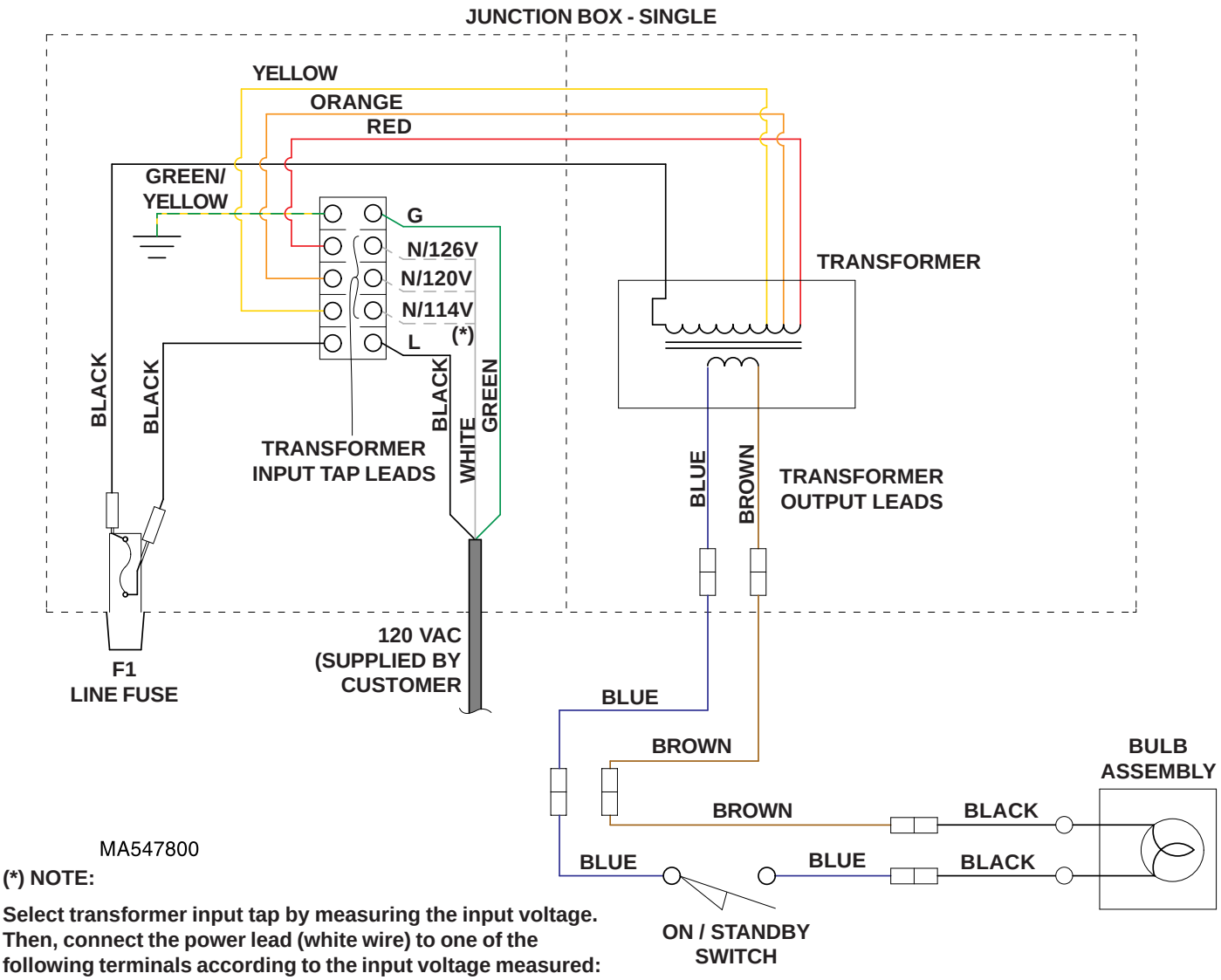
6. Using a multimeter, measure the input voltage between black power lead and white neutral lead of customer supplied wiring. Record this voltage. See Figure 5.

WARNING
Make sure facility supplied wiring is turned to off for the following step. Failure to do so could result in electrical shock causing serious personal injury or death.

7. Turn off facility power breaker so there ***is no*** power in customer supplied wiring.

8. If voltage measured in step 6 was 117.0 VAC or lower, connect the white neutral lead of customer supplied wiring to the terminal marked **N/114V** for single units ***or*** **N1/114V** or **N2/114V** for double units (see Figure 5).
   If voltage measured in step 6 was between 117.1 to 123.0 VAC, connect the white neutral lead of customer supplied wiring to the terminal marked **N/120V** for single units ***or*** **N1/120V** or **N2/120V** for double units (see Figure 5).
   If voltage measured in step 6 was 123.1 VAC or higher, connect the white neutral lead of customer supplied wiring to the terminal marked **N/126V** for single units ***or*** **N1/126V** or **N2/126V** for double units (see Figure 5).

9. Connect the black power wire from customer supplied wiring to the terminal marked **L**.



(*) NOTE:

Select transformer input tap by measuring the input voltage. Then, connect the power lead (white wire) to one of the following terminals according to the input voltage measured:
117.0 VAC or lower - Use the terminal marked N/114V.
117.1 VAC to 123.0 VAC - Use the terminal marked N/120V.
123.1 VAC or higher - Use the terminal marked N/126V.

Figure 5. Wiring Diagram (Sheet 1 of 2). Single units

10. Connect the green earth ground wire from customer supplied wiring to the terminal marked with a ground symbol.

CAUTION

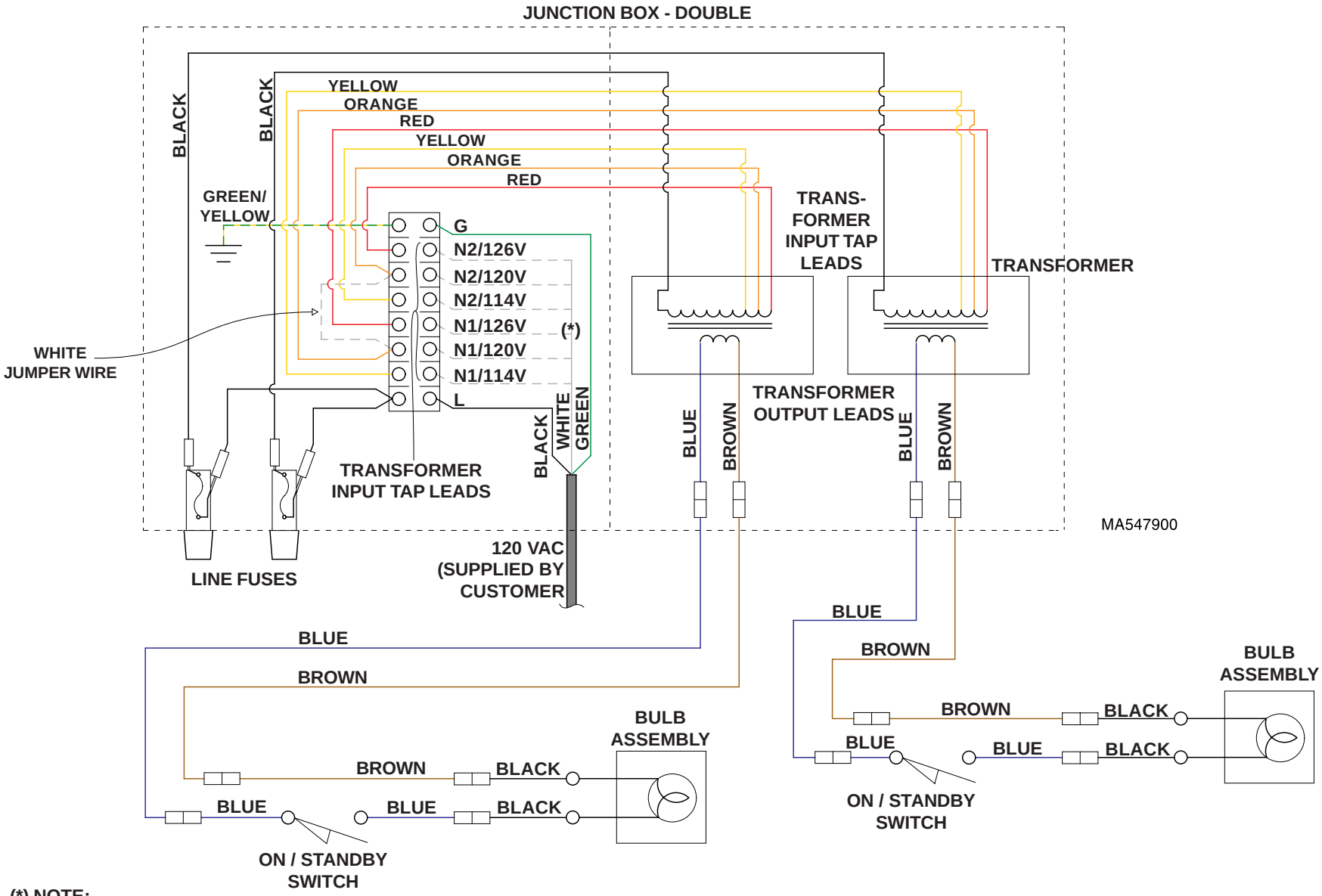
Failure to properly connect and insulate wires in junction box could result in a short or electrical shock to personnel or improper system operation.

- **Always use a strain relief (conduit fitting) between facility wiring and the junction box.**
- **Always connect the earth ground wires inside the junction box.**
- **Double Units - Always make certain the white jumper wire is properly positioned.**

11. If light system is a dual light, the white jumper wire on the terminal block may need to be repositioned depending on the voltage measurement taken in step 6. If the voltage measurement was 117.0 VAC or lower, use white jumper wire to connect **N1/114V** to **N2/114V**. If the voltage measurement was 117.1 VAC to 123.0 VAC, keep white jumper wire where it is; connecting **N1/120V** to **N2/120V**. If the voltage measurement was 123.1 VAC or higher, use white jumper wire to connect **N1/126V** to **N2/126V**.

NOTE

It is especially important to perform steps 12 and 13 now if the ceiling is a drywall/plastered ceiling; these steps cannot be performed later.



(*) NOTE:

Select transformer input tap by measuring the input voltage. Then, connect the power lead (white wire) to one of the following terminals according to the input voltage measured:
117.0 VAC or lower - Use the terminal marked N1/114V or N2/114V.
117.1 VAC to 123.0 VAC - Use the terminal marked N1/120V or N2/120V.
123.1 VAC or higher - Use the terminal marked N1/126V or N2/126V.

Figure 5. Wiring Diagram (Sheet 2 of 2). Double units

12. Feed brown and blue transformer output wires out of wire hole (7, Figure 7) in bottom of junction box.

13. Position box cover (2) on junction box (3) and secure by tightening four screws (1).

Ceiling Plate Assembly Installation

NOTE

The following step describes one typical way of mounting the ceiling plate assembly. However, this method may not work for all installations; if not use the following procedure for guidance only.

1. Install four 1/2" nuts (1, Figure 6) on four all-thread bolts (2) (not supplied) as far as possible.

2. Install ceiling plate assembly (3) on four all-thread bolts (2) and secure with four 1/2" lockwashers (4) and 1/2" nuts (5).

NOTE

For the following step, make sure nuts (1) ***are not*** contacting the ceiling plate assembly (3). Otherwise, leveling of ceiling plate assembly with nuts (5) will not be possible.

3. Adjust four nuts (5) until bottom of ceiling plate assembly (3) is flush with surface of ceiling.

WARNING

Failure to install nuts (5) so that there are at least two full threads visible below nuts, could result in unit falling.

4. Use a level to check the levelness of ceiling plate assembly (3) in all directions. Adjust four nuts (5) as necessary until the ceiling plate assembly (3) is level in all directions and flush with surface of ceiling.

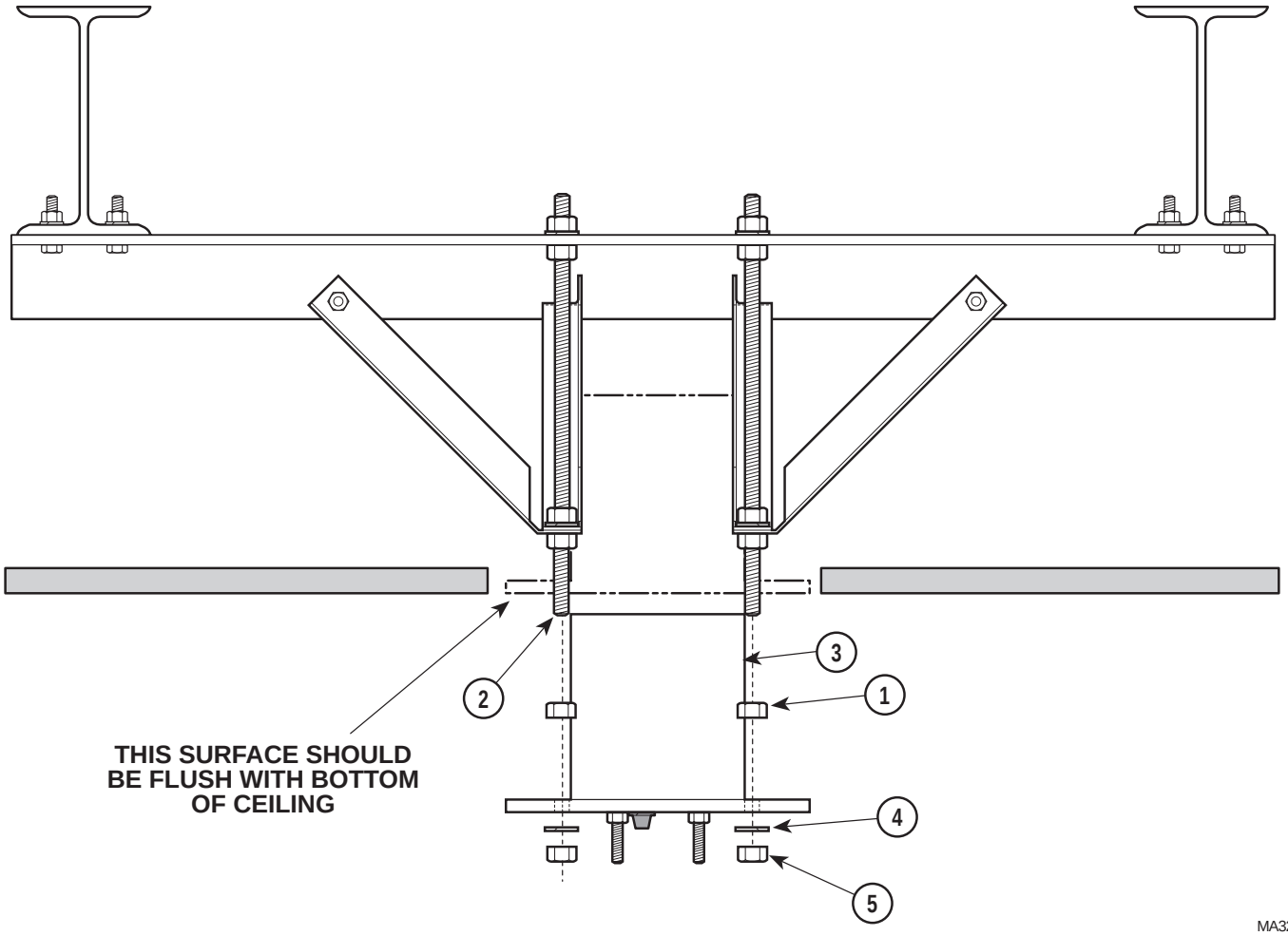


Figure 6. Suggested Ceiling Plate Assembly Installation

5. Tighten nuts (1) against ceiling plate assembly (3); then recheck levelness of ceiling plate and readjust if necessary.

Down Tube Installation

1. Thread three 3/8" x 16 hex nuts (4, Figure 7) (supplied) onto three bolts (5) until they are hand-tight; then back off each nut 1 full turn.

2. Position down tube (6) near wire hole (7).

3. Connect brown wire (A) from junction box (3) to brown wire (A) from down tube (6).

4. Connect blue wire (B) from junction box (3) to blue wire (B) from down tube (6).

5. Install down tube (6) on three bolts (5) and secure with three 3/8" lockwashers (8) and 3/8" x 16 hex nuts (9) (supplied).

WARNING
Failure to install nuts (9) so that there are at least two full threads visible below nuts, could result in unit falling.

6. Under normal circumstances, the down tube (6) should be level enough to provide drift-free operation. If, after complete assembly and operation of the light system, drifting is observed, use a protractor or level (C) to adjust nuts (9) until down tube (6) is vertical (+/- 0.5º); then tighten nuts (4).

7. If light system is a dual light, repeat steps 1 through 6 for remaining down tube (6).

8. Slide ceiling cover (10) onto down tube(s) (6).

9. Attach ceiling cover (10) to ceiling plate (11) with four #10-24 x 3/4" screws (12) (supplied).

Cross Tube Assembly Installation

1. Slide ball pivot sleeve (1, Figure 8) onto down tube (2), making sure screw hole in sleeve is towards the bottom.

2. With ball pivot sleeve (1) positioned as high as possible on down tube (2), pull blue and brown wires (6) through top window (A) of down tube.

NOTE

There are three screw holes in cross tube (3); two of the holes are larger and have a courser thread. Use these two holes to secure cross tube assembly with screws (5). The other hole is for securing ball pivot sleeve.

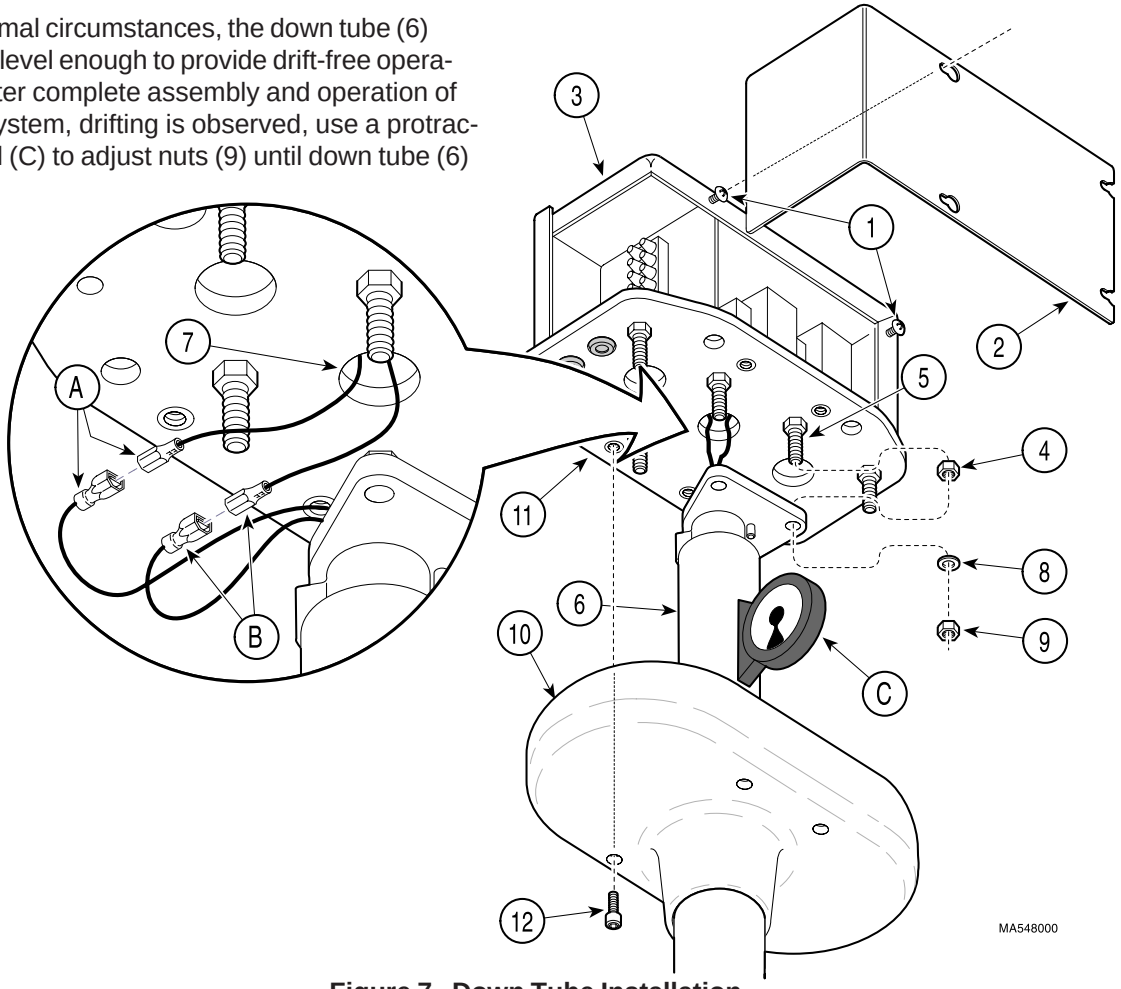


Figure 7. Down Tube Installation

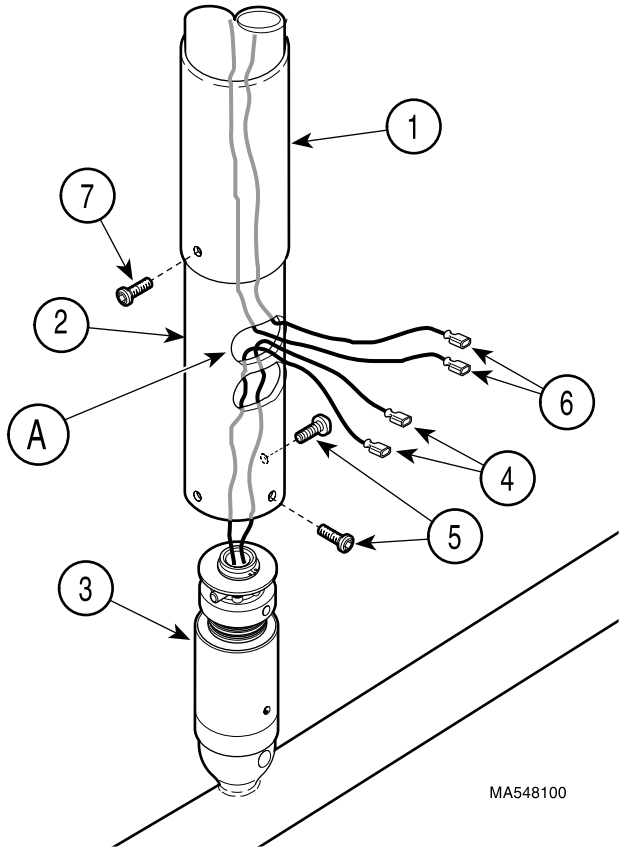


Figure 8. Cross Tube Assembly Installation

3. Align three screw holes; then insert pivot shaft of cross tube assembly (3) into down tube (2). Secure cross tube assembly in position with two #10-24x3/8" black oxide button head screws (5).

4. Feed two wires (4) through top window (A) of down tube (2).

5. Connect brown wire (4) to brown wire (6) and blue wire (4) to blue wire (6). Push wires into top window (A).

6. Slide ball pivot sleeve (1) down into position and secure with one #10-24x3/8" (New Units Only) phillips head screw (7) (Refer to page 4).

Bulb Installation

NOTE

Screws (1) are captive screws. Only loosen captive screws; do not try to remove them.

1. Loosen three captive screws (1, Figure 9) and separate top cap (2) from support arm pivot (3).

2. Remove packing material from inside of lighthead.

WARNING (*)

The maximum allowable bulb wattage which can be used in this light is 100 Watts. There is a risk of fire or equipment damage if 100 Watt limit is exceeded. Use Midmark P/N: 015-1357-00.

NOTE

Halogen bulbs are sensitive to body oils. Be sure not to touch the glass portion of the bulb during relamping or cleaning. Body oils create a hot spot on the bulb and may cause the bulb to burn out prematurely. If the glass portion of the bulb is handled, wipe with a clean, soft, lint free cloth. Wipe with alcohol and pat dry.

3. Using a cotton glove or similar clean cloth, grasp the new bulb (4) (supplied) and insert new bulb into bulb socket (5). Push bulb in until its prongs bottom out; there should be approximately 1/16 in. (1.6 mm) gap between bulb socket and glass base of bulb. Forcing bulb in further will cause damage.

NOTE

The top cap is keyed which allows it only to be installed in one position.

4. Align the key of the top cap (2) with key hole in support arm pivot (3). Then secure top cap (2) on support arm pivot (3) by tightening three captive screws (1). Make sure wiring (6) is tucked up above light block as much as possible and does not hang down into path of light.

Housing Cap Installation

1. Install housing cap (2, Figure 12) on ballast housing (3) and secure with screw (1).

Operational Test

1. Turn the ON / STANDBY switch (1, Figure 10) to ON.

2. Observe. The light should illuminate.

3. Position the light 36" from the table and aim the light at the table.

4. Observe. There should be an evenly distributed circular pattern of bright light, approximately 8 inches in diameter, on the table surface.

5. Rotate the lighthead, lamp tube, cross tube, and down tube through their range of motions as shown on the illustration (See Figure 10). Release the lighthead at different positions.

6. Observe. The lighthead should be able to be positioned easily through the entire range of its

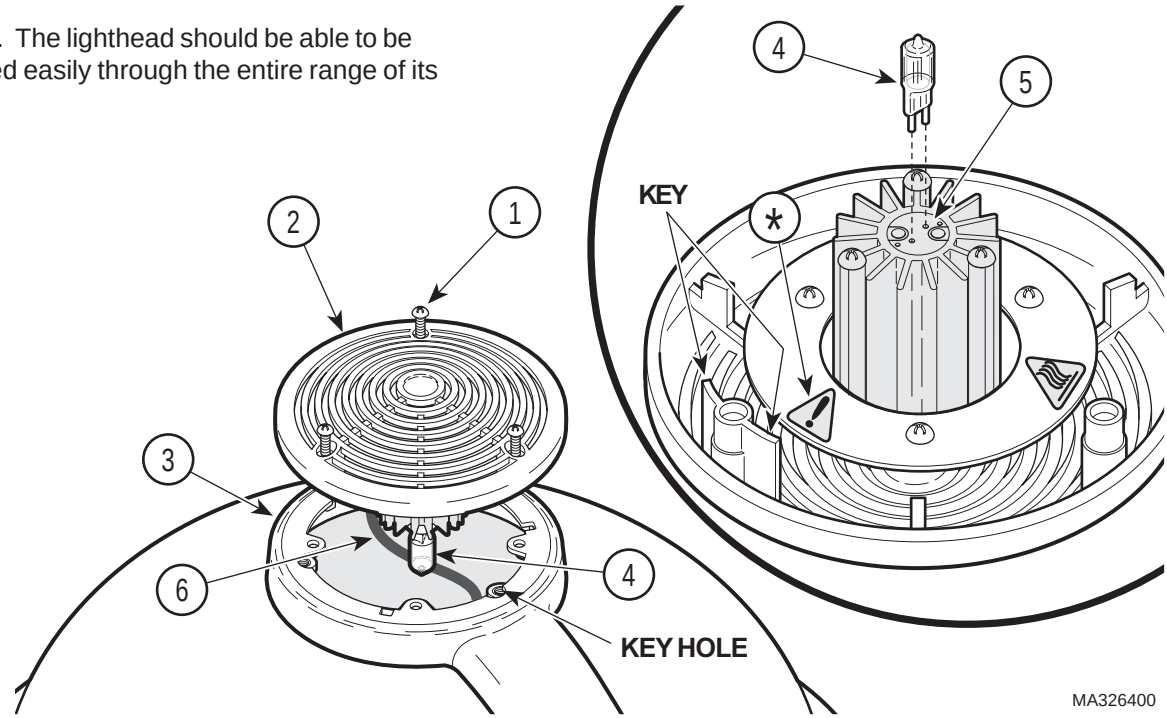


Figure 9. Bulb Installation

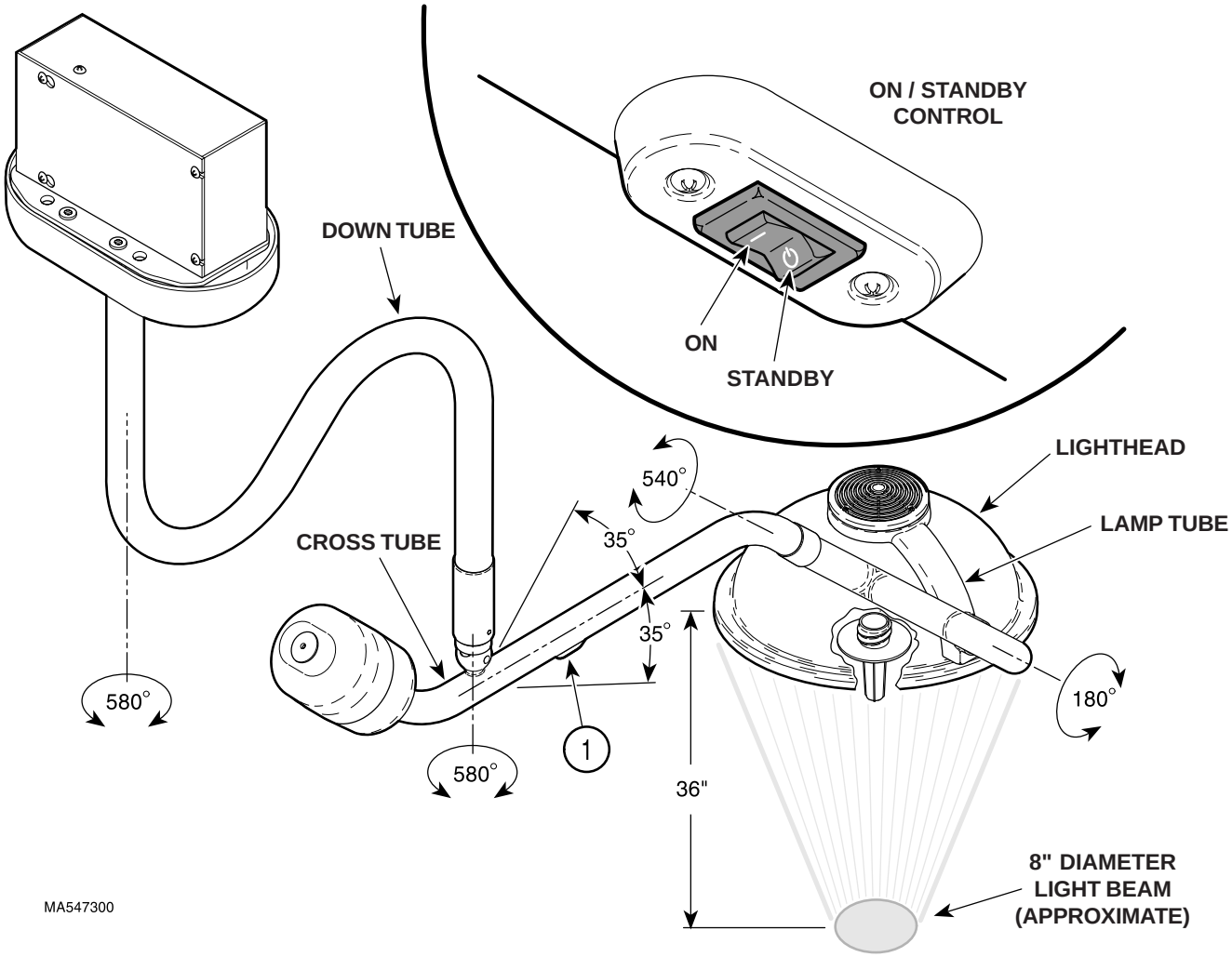


Figure 10. Operational Test

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TROUBLESHOOTING

Troubleshooting Guide

If any problems are discovered during the installation process, refer to the following table (Table 1) to determine the cause of the problem.

TABLE 1. TROUBLESHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE	SOLUTION
no light from lighthead	*lighthead is off*	turn on / standby switch to on
no light from lighthead; on / standby switch is on	*bulb has burned out or has not been installed*	refer to bulb installation procedure in this manual
	fuse in junction box is blown	inspect/replace the fuse located inside the ceiling cover
	no power to the junction box	check for facility power to the junction box
	transformer is malfunctioning	check for 24.5 VAC output from transformer (when loaded).
no light from lighthead although the bulb and fuse were checked; lighthead flashes intermittently when lighthead or arms are moved	*circuit or wiring problem within arm assemblies, junction box, or other part of lighting system*	check all wiring connections. If problem persists, call Midmark Technical Support: 1-800-Midmark
down tube does not rotate freely or drifts when released in desired position	*improper installation of ceiling plate (deflects too much or is not level)*	check for excessive flexing of ceiling support structure and/or check if ceiling plate is level. Readjust as necessary.
lamp tube does not rotate freely or drifts when released in desired position	*brake tension needs adjusted*	Call Midmark Technical Support: 1-800-Midmark
cross tube rotates (at ball pivot joint) too stiffly or drifts when released in desired position	*ball pivot joint tension needs to be adjusted or cross tube counterbalance needs adjusted*	refer to ball pivot joint tension adjustment procedure in this manual. If proper tension cannot be achieved, refer to the cross tube counterbalance adjustment procedure in this manual and then repeat main pivot joint tension adjustment. If problem still persists, call Midmark Technical Support: 1-800-Midmark
lighthead does not rotate freely at lamp tube or drifts when released in desired position	*brake needs adjustment*	Call Midmark Technical Support: 1-800-Midmark

motion. When the lighthead is released in any position, no drifting should occur at any axis.

7. If any problems are discovered, refer to the trouble-shooting guide for adjustment and repair tips.

ADJUSTMENTS

Ball Pivot Joint Tension Adjustment

1. Remove screw (1, Figure 11) and slide ball pivot sleeve (2) up out of way.

2. Rotate cross tube (3) until adjustment hole (4) appears in the adjustment window opening.

NOTE

There are three settings which the ball pivot cam (5) can be set for: light tension, medium tension, or stiff tension (see Figure 11). These settings may be changed according to the operator's preference.

3. Insert screwdriver, into adjustment hole (4). Then, using the screwdriver, rotate ball pivot cam (5) to the desired tension setting.

4. Remove the screwdriver and move the cross tube (3) about the ball pivot joint in a circular motion and up and down motion to ensure the setting is the one desired. Move the cross tube (3) to a horizontal position and release it. The cross tube should not drift in any direction. If it does, a higher tension setting is required. Repeat steps 3 and 4 until the desired tension adjustment is achieved with no drifting of the cross tube. If a satisfactory tension adjustment cannot be achieved, perform the cross tube counterbalance adjustment procedure and then repeat the ball pivot joint tension adjustment procedure.

5. Slide ball pivot sleeve (2) down into position and secure with screw (1).

Cross Tube Counterbalance Adjustment

1. Remove screw (1, Figure 11) and slide ball pivot sleeve (2) up out of way.

2. Rotate cross tube (3) until adjustment hole (4) appears in the adjustment window opening.

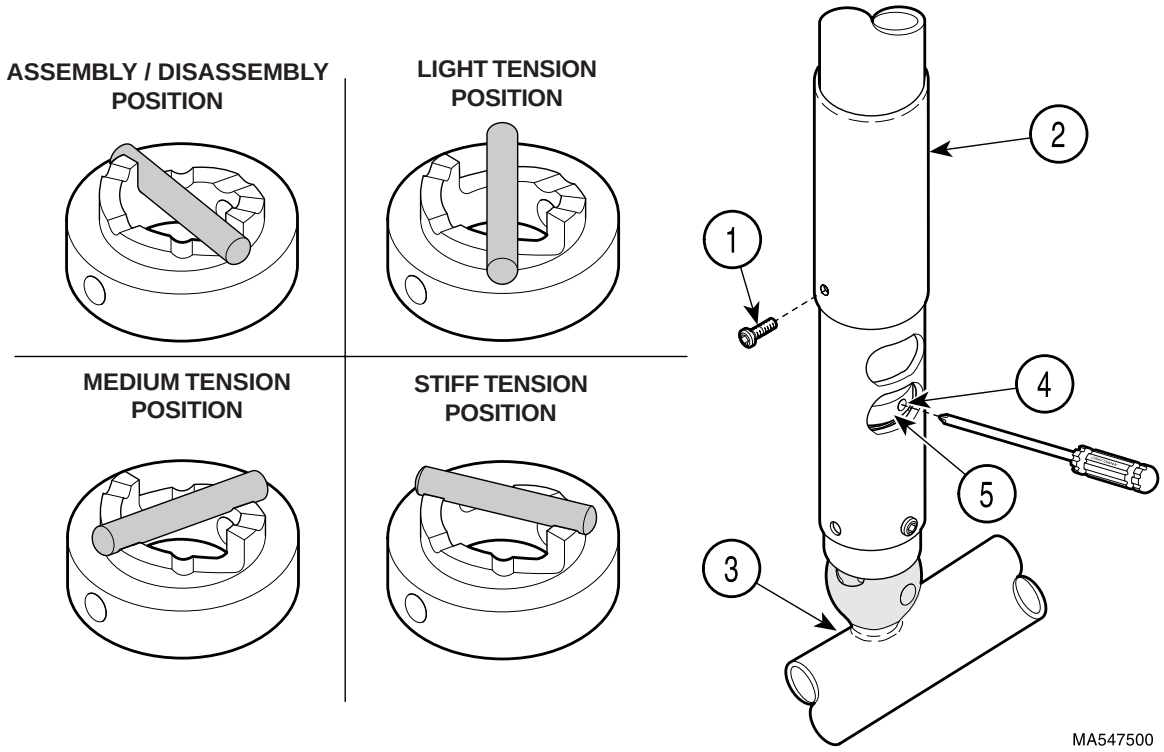

Figure 11. Ball Pivot Joint Tension Adjustment

3. Insert screwdriver, into adjustment hole (4). Then, using the screwdriver, rotate ball pivot cam (5) to the assembly / disassembly setting. Remove screwdriver.

4. Remove screw (1, Figure 12) and housing cap (2) from ballast housing (3).

NOTE

One way to determine if cross tube is balanced properly is to raise the cross tube above horizontal, release it, and observe where it stops. Then lower the cross tube below horizontal plane, release it, and observe where it stops. The cross tube should return to the horizontal position and remain there; if it does, the cross tube counterbalance is adjusted properly.

Turning screw (4) in clockwise direction will raise the lighthead end of cross tube. Turning screw (4) in counterclockwise direction will lower the lighthead end of cross tube.

5. Adjust screw (4) until cross tube (5) balances in a horizontal position.

6. Install housing cap (2) on ballast housing (3) and secure with screw (1).

NOTE

It is recommended that you start with the light setting and then proceed to the medium or stiff setting only if necessary to prevent drifting.

7. Insert screwdriver, into adjustment hole (4, Figure 11). Then, using the screwdriver, rotate ball pivot cam (5) to the light, medium, or stiff setting as desired by the operator(s). Remove screwdriver.

8. Slide ball pivot sleeve (2) down into position and secure with screw (1).

CALLING FOR SERVICE

If you have a problem that you can't solve, have the information on the inside front cover of this manual completed and available and call:

1-800-Midmark (1-800-643-6275); 8:00 AM until 5:00 PM (Eastern Standard time in the U.S.); Monday thru Friday, except for standard U.S. holidays.

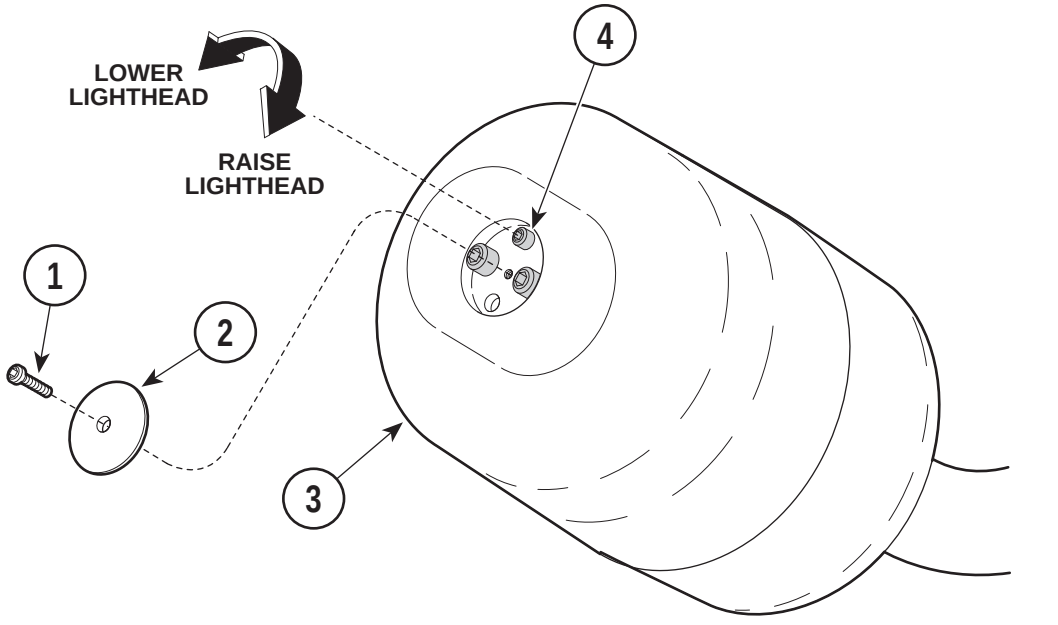

Figure 12. Cross Tube Counterbalance Adjustment

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LIMITED WARRANTY

SCOPE OF WARRANTY

Midmark Corporation ("Midmark") warrants to the original purchaser its new Alternate Care products and components (except for components not warranted under "Exclusions") manufactured by Midmark to be free from defects in material and workmanship under normal use and service. Midmark's obligation under this warranty is limited to the repair or replacement, at Midmark's option, of the parts or the products the defects of which are reported to Midmark within the applicable warranty period and which, upon examination by Midmark, prove to be defective.

APPLICABLE WARRANTY PERIOD

The applicable warranty period, measured from the date of delivery to the original user, shall be one (1) year for all warranted products and components.

EXCLUSIONS

This warranty does not cover and Midmark shall not be liable for the following: (1) repairs and replacements because of misuse, abuse, negligence, alteration, accident, freight damage, or tampering; (2) products which are not installed, used, and properly cleaned as required in the Midmark "Installation" and or "Installation / Operation Manual for this applicable product. (3) products considered to be of a consumable nature; (4) accessories or parts not manufactured by Midmark; (5) charges by anyone for adjustments, repairs, replacement parts, installation, or other work performed upon or in connection with such products which is not expressly authorized in writing in advance by Midmark.

EXCLUSIVE REMEDY

Midmark's only obligation under this warranty is the repair or replacement of defective parts. Midmark shall not be liable for any direct, special, indirect, incidental, exemplary, or consequential damages or delay, including, but not limited to, damages for loss of profits or loss of use.

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